

NetworkWorld

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TOKEN-RING
PLEASURE**

Vendors ready
upgrade plans
as full-duplex token-ring
nears standardization. Page 14.



THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Special report

Copyright warning

Web publishing is proving to have its legal risks.



By Chris Nerney

Call it the day the music died.

Or call it the day the world's largest music publisher trained its powerful legal guns on the most popular Internet site for guitarists.

After being threatened with legal action for copyright infringement, the University of Nevada at Las Vegas (UNLV) on Feb. 8 shut down the On-Line Guitar Archive (OLGA), an FTP site where instructions for some 15,000 songs were housed.

The clash between EMI Music Publishing and OLGA underscores the embryonic nature of copyright issues and the Internet. Only three copyright cases have been decided in the courts so far, according to attorney Lee Gesmer of Lucash, Gesmer & Associates.

See Copyright, page 76

HOW TO AVOID RUNNING AFOUL OF COPYRIGHT LAWS

- ▶ If material is copyrighted, get permission to use it from the copyright holder. If you can't get permission, don't use it.
- ▶ Ignorance is bliss (or at least a defense). If you don't know something is copyrighted, you may be an innocent infringer, limiting your liability for damages.
- ▶ Act in good faith. If you learn you are transmitting copyrighted material, remove it immediately.

Big guns fire up high-speed SNA schemes

By Michael Cooney

Anaheim, Calif.

The Advanced Peer-to-Peer Networking/High Performance Routing market is getting mighty crowded.

The Big Three internetworking vendors — 3Com Corp., Bay Networks, Inc. and Cisco Systems, Inc. — this week will all announce support for HPR and

See APPN/HPR, page 76

MORE ON-LINE

- A look at how the APPN Implementers Workshop is pushing HPR to link SNA to ATM nets
- The latest HPR specs
- An article on Cisco's plans to crack the SNA market

Select News+ then Front Page.



IBM puts meat on ATM bones

Nways switches to gain high-speed adapters and new OS.

By Michael Cooney

Anaheim, Calif.

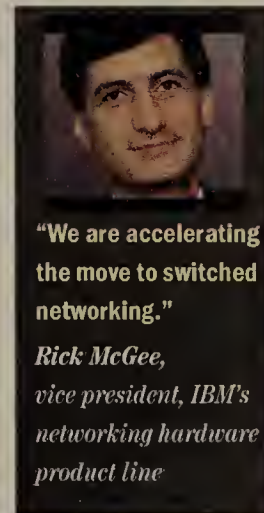
IBM is finally ready to put the ATM into its ATM product line.

The company in May will announce what could be its most important Asynchronous Transfer Mode activity this year: 155M bit/sec and low-speed ATM interfaces for its Nways 2220 switches as well as switch software for controlling high-speed WAN links (see graphic, page 10).

Company officials last week

previewed plans for the backbone switches at IBM's Share

user conference here. The new offerings should help erase customer concerns surrounding IBM's Nways switches, which until now have been limited to handling mainly frame relay traffic. Even though they are based on an ATM switching fabric, the Nways devices have lacked ATM interfaces.



"We are accelerating the move to switched networking."

Rick McGee, vice president, IBM's networking hardware product line

"We had to walk before we could run, and we're ready to run," said Stu

See ATM, page 10

COLLABORATION



Exploring for oil in Siberia from a desk in Houston? An ATM net built by the ARIES project team makes it possible. See Collaboration. Follows page 40.

Oracle replicates rivals

Plans to share DBMS info with Sybase, Informix and CA.

By Barb Cole

Redwood Shores, Calif.

Oracle Corp. doesn't care if you mix in competitors' databases —

it will replicate your data anyway.

Under a plan to be detailed later this month, the database giant will offer the bidirectional movement of data between its flagship database and those from Computer Associates International, Inc., Informix Software, Inc. and Sybase, Inc.

Anchoring the plan is a series of gateways, each designed to work with a particular back end.

Last December, the company revealed plans to add replication support to some of its gateways and rolled

PRODUCTS WITH REPLICATION ON THE RISE



SOURCE: THE YANKEE GROUP, BOSTON

REPLICATION ROUNDUP

Xerox PARC conducts replication research. Page 77.

out the first gateway for IBM's DB2. The company did not offer any other specifics.

See Oracle, page 77

Banyan pricing leaves sour taste

By Kevin Fogarty

Chicago

Banyan Systems, Inc. this week will float a plan to simplify the arcane pricing that has been the bane of its customers for years.

The plan promises savings on servers of as much as 70%. But customers might want to read the fine print — a series of requirements adds costs and complexity, critics argue.

Banyan is replacing its a la carte product plan with a simple

menu. Customers will be presented with two server packages, each of which includes previously discrete options, according to internal Banyan documents obtained by

Network World.

The company is also introducing a simpler per-user pricing scheme, to replace its concurrent user licensing.

But before users can buy any products under the new pricing plan, they must jump through a

See Banyan, page 76



ATMospheric pressure

The ATM Forum races to bring applications to ATM nets. The latest in our ATM standards progress series begins on page 53.

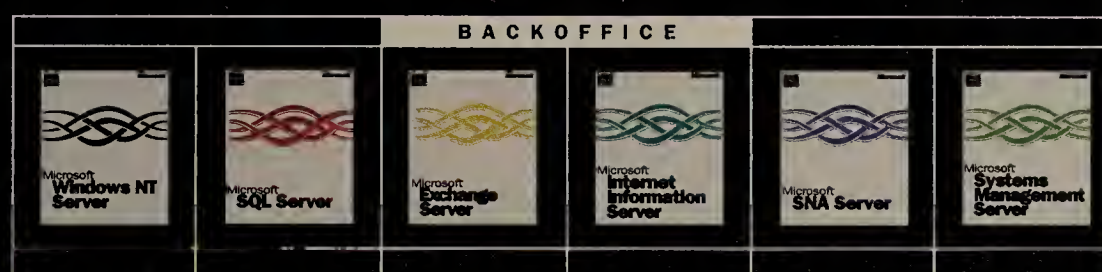


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This Week



News+

The Front Page:

- **On-line copyright:** Documents on current cases and on-line copyright law as well as sites just begging for trouble.
- **Database replication:** More about the Bayou project at Xerox's PARC, where researchers have posted a number of papers on innovative replication techniques.
- **HPR:** Additional details on Cisco's plans to support HPR in its 7000 series routers.

The Technical Sections:

- **Telecommuting:** We've put together a telecommuting start-up kit, including links to primers, sample needs assessments and employee policies, as well as a look at the future from the man who invented the term "telecommuting," in WANs & Internetworking.
- **DCE:** Documents on how the Open Software Foundation and others are developing Web interfaces to back-end DCE services, in Client/Server Applications.
- **Web servers:** It's a server giveaway as Netscape and Microsoft battle for the HTTP market. But they're not alone. Find out who else is giving away servers, in Electronic Commerce.
- **Ethernet:** The latest Ethernet switch and hub offerings, in Local Networks.



Forum

- Now's your chance to pose networking career questions to an expert, in Networking Careers.

this week's pick

NetWare Users International's Web site sports more than just a membership application. Download articles from the group's magazine, participate in on-line conferences and pick up handy free/shareware utilities (<http://www.nuinet.com>).

HOW TO GET ON TO NETWORK WORLD FUSION

At the welcome screen, click on First Visit and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label — handy during registration. Non-subscribers must fill out an on-line registration form.



NetworkWorld

Fusion

CONFERENCE PICK

HOT TOPIC

Marc Myers goes interactive this week. Read his latest Shared Logic column, then tell him what you think.

Select Forum, Columnists then Shared Logic.

NetworkWorld

An IDG Publication

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It could cost more
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NetworkWorld's Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.

News briefs, March 11, 1996

Netscape, Novell teaming up

■ Novell, Inc. and Netscape Communications Corp. next week are expected to announce at Novell's Brainshare '96 conference an agreement to unite the companies in competition with Microsoft Corp. The deal reportedly calls for Netscape to support NetWare Directory Services in its Navigator browser and for Novell to license a range of new Netscape servers. Observers are skeptical about the possibility of a merger between Netscape and Novell, but speculation continues to circulate that the two are negotiating a tighter partnership.

Not just another TalkShow

■ Future Labs, Inc. next week plans to announce Internet TalkShow, a data conferencing service that allows users with a PC, modem and Web browser to simply click on the Future Labs home page to set up a collaborative session. The Los Altos, Calif., firm's service includes white-boarding and application-sharing capabilities, but it does not have a video component. It will be free until July; users can simply download their client software from Future Labs' home page (<http://www.futurelabs.com>).

WorldCom frame relay zooms

■ As expected, LDDS WorldCom last week became the first major interexchange carrier to introduce frame relay above T-1 speeds. The service works with 45M bit/sec access and a T-3 data service unit/channel service unit (NW, Jan. 22, page 14). Initial subscribers are expected to include Internet service providers and corporate users with large bandwidth requirements that do not want to subscribe to public Asynchronous Transfer Mode services.

Available port speeds:

- ▶ 6M bit/sec
- ▶ 10M bit/sec
- ▶ 19.8M bit/sec

Available permanent virtual circuits:

- ▶ 16K - 1.024M bit/sec

More than NT promises

■ Microsoft Corp. late this month or in early April plans to ship the first revision of the Windows NT 4.0 beta-test version. Release candidate 2 will include a series of wizards that automate administrative tasks in NT Server. It will also include drivers for a new secure Internet transport protocol called Point-to-Point Tunneling Protocol and a protocol sniffer feature. In addition, it will feature the Microsoft Office FastFind Server, a search engine designed to rapidly find MS Office documents.

U.S. Web debuts

■ Start-up U.S. Web this week will air plans to create a net of Internet service providers (ISP) that will offer a standard set of services for building World-Wide Web sites. U.S. Web, started by former Novell, Inc. officials Joe Firmage, Toby Corey and Sheldon Laube, will take 7% of the revenue from ISP franchisees in return for training, style guides, development tools and national marketing.

SMC to make ATM bid

■ Standard Microsystems Corp. this week will make its foray into the Asynchronous Transfer Mode market with its ATM Power family of adapter cards. SMC will offer 25M bit/sec and 155M bit/sec adapters for PCI-, Sbus- and EISA-based workstations. The cards will be available later this year. Pricing has not been set.

IBM's Eagle about to land

■ IBM will introduce a series of software bundles on March 26 for AIX, OS/2 and Windows NT servers. Lotus Development Corp. Notes and database, Internet, communications, systems management, directory and security, and transaction processing applications will be included. The bundles were originally expected in the fall of 1995.

Shiva sharpens up product line

■ Shiva Corp. this week is expected to announce an upgrade of its ShivOS operating system software as well as availability of integrated ISDN Basic Rate Interface modules for its LanRover/PLUS remote LAN access offering. Version 4.0 of ShivOS includes many ISDN features, such as tariff management.

Block telephone calls across the Internet, carrier group demands

By David Rohde
Washington, D.C.

A trade association of smaller long-distance carriers stunned the networking industry last week by petitioning the Federal Communications Commission to ban telephone calls across the Internet.

Although the petition by America's Carriers Telecommunication Association (ACTA) was ridiculed by many in the Internet community, observers said the petition was likely to strike a nerve at the FCC.

The reason is: ACTA argued that unlike phone companies, providers of voice-over-Internet services do not contribute to the Universal Service Fund or make other contributions designed to extend telephone service to all U.S. citizens.

And under the recently enacted Telecommunications Act of 1996, such obligations now extend to all communications carriers, not just the big ones. A priority of FCC Chairman Reed Hundt, reform of the universal-service regulations is one of the first tasks the agency will take on under the new law.

ACTA named several providers of Internet telephony (see graphic) and demanded that the FCC "stop their unauthorized provisioning of telecommunications services" until they file tariffs and gain certification as common carriers.

ACTA — principally consisting of small long-distance companies with several switches and pure telecommunications resellers — initially did not appear to be likely to gain the support of large interexchange carriers.

"We don't see Internet telephony as a threat," said Tom Evslin, vice president of AT&T WorldNet Services. "We support the use of all software over Internet protocols."

In fact, some observers initially laughed off the petition. They said Internet telephony is not comparable to circuit-

switched voice service because the quality is subpar. Its half-duplex nature allows only one party to talk at a time, and it does not yet account for much volume.

But ACTA attorney Charles

tary problem that will be quickly fixed," he said. "Certainly, it isn't on the radar screen of AT&T, with \$78 billion in revenue," Helein added. But ACTA wants to make sure the problem is caught before it gets out of hand.

"If you could stop a robber before going inside the bank, you would do it," Helein said.

Left unchecked, the petition said, the growth of Internet telephony could damage the telecommunications infrastructure of the country, which requires telephone companies to pony up huge sums for net construction and maintenance.

Helein conceded that ACTA may have difficulty arguing against a service that is free or low-cost once users get past access costs. "But nothing that is free is in the public inter-

Asking Uncle Sam to step in

ACTA, a trade group of long-distance carriers, asked the FCC to ban the following Internet telephone offerings:

Product	Company	Based
Internet Phone	VocalTec	Northvale, N.J.
WebPhone	Internet Telephone	Boca Raton, Fla.
Digiphone	Third Planet Publishing	Dallas
WebTalk	Quarterdeck	Marina del Rey, Calif.

ACTA also asked the FCC to ban other Internet phone services not specifically named.

SOURCE: FCC, WASHINGTON, D.C.

Helein is not buying it. Half-duplex communications and other drawbacks "are a momen-

est if you have investment and jobs and infrastructure associated with it," he said. ■

Novell eases deployment of NetWare in IP networks

By Kevin Fogarty
Orem, Utah

Novell, Inc. last week announced that it has revamped its parochial TCP/IP protocol for NetWare.

NetWare/IP 2.2 includes support for Dynamic Host Control Protocol (DHCP) and features a Domain Name Service (DNS) NetWare Loadable Module. The additions should make it easier for companies to deploy NetWare servers in multivendor IP environments.

It could also make it easier for customers to tie IPX nets to IP by enabling NetWare/IP 2.2 servers to act as gateways between net-

works supporting the different protocols.

DHCP allows a server to assign an IP address to a client as it connects to the network, reducing the amount of administrative work by eliminating the need to assign static IP addresses to each network node. NetWare/IP already supports BOOTP, a client-based technology that serves a function similar to that of DHCP.

The DNS module lets NetWare act as the main DNS server on a network by consolidating IP address resolution in single data-

See Novell, page 77

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Acquisition activity shakes up net industry

Whittaker, 3Com and U.S. Robotics reach for their wallets.

By Jodi Cohen

Whittaker Corp., 3Com Corp. and U.S. Robotics last week all used acquisitions to improve their standing as one-stop network product shops.

Whittaker is paying \$117 million to take Xyplex, Inc. off of Raytheon Co.'s hands — less than two years after Raytheon bought the internetworking equipment vendor for \$170 million as part of a larger effort to become a player in the networking market. But a Raytheon spokesperson last week said the company is no longer interested in the market.

Xyplex's offerings — including remote access products, ter-

token-ring workgroup hubs and switches, LANplex switches, ONcore chassis-based switching hubs and NetBuilder II routers.

3Com also plans to base management tools on RMON 2 for WANs, Internet traffic and remote access devices.

Axon employs about 50 people and is based in Newton, Mass. The company will become part of 3Com's new Network Management Division.

Extending its reach

Separately, U.S. Robotics bought its way into the LAN arena last week when the company announced the acquisition of LAN switch vendor Amber

McAfee and Symantec snap up management tool vendors.

By Ben Heskett

Rivals McAfee and Symantec Corp. last week both announced acquisitions to help expand LAN management offerings.

McAfee purchased Vycor Corp., a company that makes help desk software called Vycor Enterprise, and Symantec Corp. acquired Fast Track, Inc., which makes software to manage servers and other net devices.

By acquiring Vycor, McAfee will be able to provide customers with an integrated set of help desk and LAN management utilities, according to Waverly Deutsch, an analyst with Forrester Research, Inc. in Cambridge, Mass.

McAfee plans to include the Vycor software in a new suite of management tools called Enter-

prise Manager, due in the third quarter. Also in the suite will be McAfee's antivirus software and Saber LAN workstation LAN management tools.

The Simple Network Management Protocol-based Vycor Enterprise software enables help desks to solve problems on NetWare and Windows networks, providing them troubleshooting techniques in an SQL database.

Keeping pace

Symantec's purchase of Fast Track bulks up the company's server management product line.

Fast Track's Expose software lets companies measure usage on NetWare, Windows NT and Banyan Systems, Inc.'s VINES

LAN MANAGEMENT MERGERS

McAfee spends **\$9 million** for Vycor, maker of Vycor Enterprise, a suite of help desk tools.

Symantec drops **\$7.2 million** on Fast Track, maker of Expose, server management software that supports NetWare, Windows NT and VINES.

networks. The software can also gather statistics on network traffic on devices such as hubs using SNMP agents.

Symantec plans to integrate Expose by the end of the year with its popular Norton Administrator for Networks asset management, software distribution and metering package.

Separately, Symantec this week will formally announce the integration of Norton Administrator for Networks into Hewlett-Packard Co.'s Workgroup Node Manager Professional Suite. ■

Look who's shopping

Buyer	Who they bought	What they got
3Com	Axon	RMON probes, analyzers and applications
U.S. Robotics	Amber Wave	Workgroup Ethernet switch
Whittaker	Xyplex	Routing and WAN access products

minal servers and switching/routing hubs — will round out Whittaker's internetworking line, which consists of Asynchronous Transfer Mode and Ethernet switching hubs.

"Until now, Xyplex was practically ignored, so this gives them a boost," said Charlie Robbins, vice president of communications research at consultancy Aberdeen Group, Inc. in Boston. "Also, this deal helps Whittaker provide the routing and WAN access pieces that will allow the company to become an end-to-end player."

However, there could be some overlap between the Xyplex gear and that obtained by Whittaker through its Hughes LAN Systems, Inc. acquisition last year.

The big get bigger

Continuing on its shopping spree, 3Com agreed to acquire Axon Networks, Inc., a maker of Remote Monitoring (RMON) probes, analyzers and applications, for \$65 million — its 11th acquisition in five years.

Under the companies' current OEM relationship, Axon's LANServant RMON technology has been integrated with 3Com's Transcend net management application and ONline hubs.

With Axon in its pocket, 3Com plans to offer RMON for its SuperStack Ethernet and

Wave Systems, Inc. in a stock deal valued at about \$40 million.

The purchase allows U.S. Robotics to break into the workgroup LAN switching market with an aggressively priced Ethernet device. The eight-port AmberSwitch is priced under \$2,000 and is expandable to 32 ports for less than \$175 per port.

The switch enables U.S. Robotics to extend its branch office technology from the WAN further into the LAN. The company currently offers remote access servers, modems and ISDN access devices. ■

By Peggy Watt and John Cox
San Francisco

Microsoft Corp. this week will try to break away from the pack in the race to dominate the emerging world of Web-based Internet applications.

At the Microsoft Professional Developers Conference here, company executives will unveil the Internet Client Architecture, previously called Sweeper, for building 32-bit OLE-based World-Wide Web applications. It also will unveil newly minted OLE controls specifically designed for the Web and a new release of the Internet Explorer Web browser.

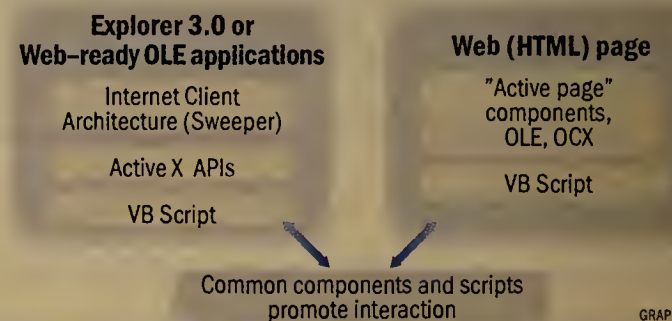
And despite pitching Visual

Basic as a Web tool, the company will disclose an aggressive plan to support the Java programming

"Doc Objects." These Doc Objects apparently will be accessible not only by the Microsoft

Microsoft's Windows/Web integration

Microsoft expects to extend and apply current technology, such as OLE, OCXs and Visual Basic (VB), to both the desktop (client) and Web server to enhance on-line interaction.



GRAPHIC BY D. BARKER

language across its Internet product line.

Cornelius Willis, product manager for Internet developer marketing at Microsoft, drew the battle lines.

"Netscape doesn't know anything about being a platform supplier," he said. "There are thousands of OLE controls in the marketplace. We're going to make them sing on the Internet."

The Microsoft client architecture includes OLE controls, called Active Controls or Active Xs, that represent various Web browser objects, such as "browser favorites" or "browser history," said David Chappell, president of Chappell & Associates, a Minneapolis consultancy.

The architecture also defines the model for representing HTML and other documents as

Explorer Web browser, but also by other Active Xs within the browser.

This model is analogous to Netscape Communications Corp.'s Plug-in architecture.

A big push is being made toward the creation of so-called active pages, to be built with Visual Basic.

These pages will include multimedia, animation, three-dimensional browsing or other mini-applications not unlike Java applets.

Developers will build the pages using Microsoft's HTML authoring tools and the new Active X controls, and then integrate OLE Custom Controls (OCX) into the Web pages. Users will access these active pages with OLE-enabled browsers, the first being Microsoft's Explorer 3.0. ■

A B E N D

abend (n) 1: abnormal end to a computer process 2: the on-line fountain of 'Net wit and high-tech humor found on Network World Fusion (www.nwfusion.com).

Good thing nobody listened...

- "I think there is a world market for maybe five computers."
— Thomas Watson, chairman of IBM, 1943
- "I can assure you that data processing is a fad that won't last out the year."
— Editor in charge of business books for Prentice Hall, 1957
- "But what . . . is it good for?"
— Engineer in the advanced computing systems division of IBM, commenting on the microchip, 1968

These and other farsighted comments from the past can be found at <http://www.cs.bgu.ac.il/~omrl/Humor/quotes.html>

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ATM

Continued from page 1

Stern, an ATM product manager at IBM. "Once these products are available — by July, at the latest — users will be able to build and easily control ATM wide-area networks in a way that wasn't available before."

Jerry Wyble, MIS network manager at Foxwoods Resort and Casino in Ledyard, Conn., said the adapters will give his net the bandwidth required to run his data center seven miles away from the casino complex.

"We'll be installing and testing the new ATM adapters next week in a production Nways switch, and if all goes well, in less than an hour, we'll have a 155M bit/sec link between the Nways at the data center and a 3Com OnCore hub at the casino," he said. "Eventually, we hope the ATM WAN adapters will let us run other remote sites countrywide from this single data center."

In addition to rolling out 155M bit/sec cards for its Model 200 and 500 Nways 2220 switches, IBM is readying an adapter for T-1 speed ATM as well as two Synchronous Optical Network (SONET) adapters.

"ATM at T-1 is a difficult proposition because it adds so much overhead to the link and the frames are so large. But we want to offer this as a way for users to consolidate lines and gain entry-level access to the ATM environment," Stern said.

The adapters will be controlled by a new release of the Nways operating system, Network Broadband Switch Control Program.

The software will support Versions 3.0 and 3.1 of the ATM Forum's User-to-Network Interface, which defines how users

interact with ATM services. A Broadband InterCarrier Interface will ensure the Nways boxes can work within carrier networks and a Network-to-Network Interface will let users link multiple Nways-based ATM nets together via a single Nways switch.

"The software will allow users to set up point-to-point ATM conversations and private virtual circuits," Stern said. "A multicast ATM capability will happen in the future, which will let users simultaneously broadcast to multiple locations."

In order to easily bring campus ATM traffic onto an Nways ATM backbone, IBM also will introduce a 155M bit/sec card for its ATM-based 8260 hub.

"In this first release, the 8260 is just act-

ing as a pass-through device; it can't act on the traffic," Stern said. "In the future, the 8260 will be able to route the traffic to other circuits and control the flow."

Analysts described IBM's upcoming ATM offerings as significant.

"It's good to see these features. Now we'll have to see if users find IBM's ATM credible and spend money on the products," said Anura Guruge, an independent analyst in New Ipswich, N.H.

The announcements cannot come too soon for some industry observers. For example, the Gartner Group, Inc. consultancy recently told clients to avoid making any near-term IBM hardware purchases — particularly ATM-based products — because of an uncertain product development plan. The consultancy recommended looking at competing products from Cisco Systems, Inc., Stratacom, Inc. or Northern Telecom, Inc.

The report specifically cited uncertainty over development of the Nways Model 200, which now will not appear until early 1997. The 200 is expected to be a hybrid router/ATM access device.

"Given that IBM previewed the Model 200 as an integral part of its Switched Virtual Networking strategy last fall, the fact that it won't be available until next year really hurts their credibility," Guruge said.

Rick McGee, vice president of IBM's networking hardware product line, brought up the Gartner Group report at Share and told attendees not to put much stock in it. Work on the Model 200 is moving ahead, he said.

IBM has had a new management team in place for a couple of months that will be more focused on bringing products to market more quickly in the next year, McGee said. ■

Congress seeks to end encryption policies

By Ellen Messmer

Washington, D.C.

If your corporate network reaches beyond the U.S., you may soon be able to give foreign offices the same encryption-capable hardware and software you use at home. That is if Congress passes legislation it proposed last week.

Under a Senate bill, introduced by Sen. Patrick Leahy (D-Vt.), and a House bill, introduced by Rep. Bob Goodlatte (R-Va.), the government would end its ban on mass-market export of equipment with strong encryption capabilities, as long as it is to a country where similar foreign equipment is available.

Designated hostile nations would still be banned from receiving encryption equipment.

Today, corporations must apply for special State Department export licenses to use products with advanced encryption overseas. This includes software such as Lotus Development Corp.'s Notes and hardware such as some IP routers.

The Senate bill explicitly bans any government-mandated key-escrow encryption plan.

The White House, though, did not appear ready to budge on its policies. White House spokesman Rick Borchelt said the Clinton Administration is troubled by the provisions in both bills to relax export controls on encryption.

"We believe export controls have slowed spread of those technologies abroad for use in crime, drug-dealing and terrorism," Borchelt emphasized. ■

ATM spring fling

IBM will soon announce the following line of ATM adapters for its Nways switches:

- ▶ 155M bit/sec single mode fiber (SMF) long range (20-40km)
- ▶ 155M bit/sec SMF short range (10-20km)
- ▶ 155M bit/sec multimode fiber
- ▶ Low-speed (T-1) ATM
- ▶ SONET

And a new release of the Nways operating system software will support:

- ▶ ATM leased lines
- ▶ ATM over Packet Transfer Mode
- ▶ UNI 3.0 and 3.1 interfaces
- ▶ Broadband InterCarrier Interface
- ▶ Network-to-Network Interface 1.0
- ▶ Permanent virtual circuits (PVC)

In addition, IBM's 8260 hub will gain:

- ▶ 155M bit/sec card
- ▶ Software support for PVC transparent mode

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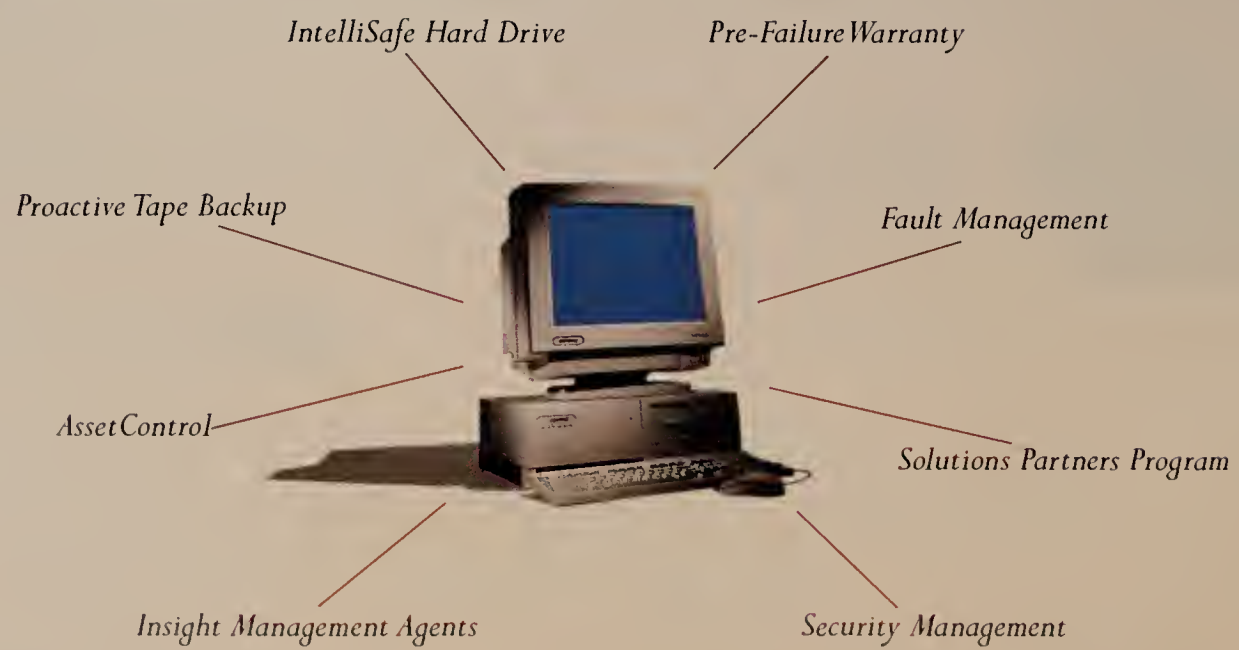
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Upgrade paths to faster token ring vary

Some vendors require adapter and hub swap-outs; others provide software changes.

By Jodi Cohen

A new standard for faster token-ring LANs is just around the corner, but customers will find that upgrade paths to it vary widely depending on the equipment they have installed.

Dedicated token ring (DTR) — often called full-duplex token ring — is set to become a final draft standard this week when the IEEE 802.5 committee meets. The standard will let devices directly connected to a token-ring switch transmit and receive data simultaneously at 16M bit/sec — effectively providing 32M bit/sec of throughput.

Some customers will be able to hang on to their current gear and migrate to the new standard via plug-in modules or software upgrades. But others will need to replace adapters, hubs and switches to take advantage of DTR, according to token-ring switch vendors.

Although token-ring customers have only recently begun deploying switches to provide network segmentation, industry

observers said DTR will be attractive for switch-to-switch connectivity and dedicated server links as soon as DTR-compliant products hit the market. That could be as soon as the second half of this year.

"[DTR] would be great for doing backup on our servers," said Tony Villani at Hingham Mutual Fire Insurance Co. in Hingham, Mass. "I'll be looking to give each server its own switch port to get the full 16M bit/sec pipe for increased performance," he added.



Cabletron's token-ring and SNA product manager Bob Travis

Getting the specifics

But determining how to upgrade different products to DTR will be a challenge for customers.

IBM customers that have token-ring adapters shipped before 1995 will have to swap them out for new cards that support DTR. However, the more recent LANstreamer adapters are software-upgradable to operate in full-duplex mode, said Robert Love, senior engineer at IBM and vice chairman of the

IEEE 802.5 committee.

Also, high-end hubs, such as IBM's 8260, will require a new switching blade that supports DTR. Love said smaller con-

DTR DETAILS

Definition:

Dedicated token-ring (DTR) — often called full-duplex token ring — is an emerging IEEE 802.5 standard that lets a device be directly connected to a switch port. A DTR-enabled device can simultaneously send and receive a 16M bit/sec datastream — in effect, providing 32M bit/sec of throughput.

Deployment:

DTR will initially be used for switch-to-switch connectivity and dedicated server links.

Migration:

Many existing token-ring adapters, hubs and switches are capable of supporting DTR via a software upgrade. But some token-ring gear will need to be replaced or will require a new module to support DTR.

centrators and older bridges, such as the 8228, will not be upgradable.

But Big Blue customers are not the only ones with a confusing migration path. Cabletron Systems, Inc. has three different token-ring switch families, all of which require different upgrades.

SmartSwitch token-ring switches, which the company expects to ship by year-end, will support DTR out of the gate.

But Cabletron's ATX switch for the wiring closet, which it acquired from Standard Microsystems Corp. last year, does not support DTR. "That switch has been shipping for almost 2 1/2 years, which is before any of these DTR conversations began," said Bob Travis, Cabletron's token-ring and SNA product manager. "So that box just does segment switching

right now."

However, Cabletron is developing a four-port token-ring module that will add DTR support to the device, he said.

Also, customers using Cabletron's I6-port TSX-I620 workgroup switch — which the company resells from Nashoba Networks, Inc. — will have to add a new four-port token-ring switch module with an FDDI uplink for DTR support.

Products from other vendors are better positioned to make the jump to DTR. Bay Networks, Inc. and Madge Networks, Inc. customers, for example, will only need to make software upgrades.

While some token-ring environments are fairly flexible, analysts agreed that others will have to undergo significant changes.

"This does put a bit of a damper on the desire for all token-ring infrastructures to be DTR-ready," said John Morency, principal at The Registry, Inc., a consultancy in Newton, Mass. ■

NetWare CTI applications to be available over Centrex

By David Rohde

Los Angeles

Local exchange carriers will soon be able to offer industry-standard computer-telephone integration (CTI) services to many of their Centrex customers with NetWare LANs.

The offerings will result from the introduction last week of DMS Computer Telephony Integration by Northern Telecom, Inc.'s carrier networks unit. The technology will be demonstrated at this week's Computer Telephony Expo here.

With DMS CTI, Centrex users served by central offices (CO) with Nortel's DMS-100 and DMS-500 switches will be able to use off-the-shelf applications written to Novell, Inc.'s Telephony Services Application Programming Interface (TSAPI).

TSAPI in action

The Novell API has spawned many third-party applications, such as help desk routines, contact management programs and point-and-click dialing for call-center operations.

TSAPI is universally supported by major private branch exchange manufacturers, but until now, it has been unavailable to Centrex users that do not use on-premises voice switches.

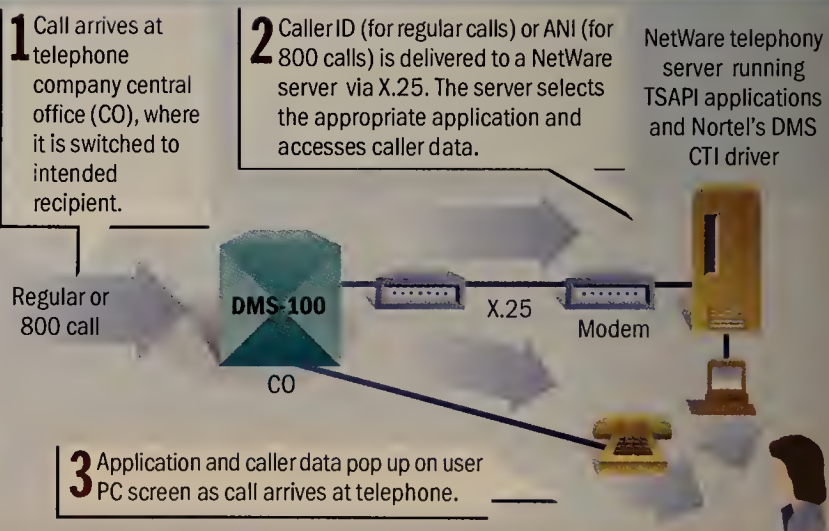
"CTI is not just for PBX users anymore," said Bill Barn-

hill, Nortel's CTI marketing manager for public networks. Some Centrex CTI offerings are already available, Barnhill said, but they use proprietary CTI

To take advantage of Centrex CTI, users must either up sign up under a tariffed plan, if one is offered, or make a special arrangement with the telephone company.

But few big local carriers use one CO switch exclusively, and most do not tariff the service because they cannot guarantee its availability everywhere.

How Centrex CTI works



links and have not been particularly popular.

Under Nortel's scheme, customers load a DMS CTI driver in a NetWare telephony server configured for a X.25 packet link to the CO for delivery of caller identification or automatic number identification (ANI). Caller data based on the caller ID or ANI then arrives at a user's PC simultaneously with telephone calls, even though there is no physical desktop link between the telephone and PC (see graphic).

As a result, analysts suggested it may be to Nortel's advantage if its key U.S. rivals in CO switching — AT&T spin-off Lucent Technologies, Inc., Ericsson, Inc. and Siemens Stromberg-Carlson — step up to the plate to match the capability.

One carrier that does tariff Centrex CTI is Ameritech Corp. Barnhill said that the carrier offers rates as low as \$65 a month for the feature for users that agree to a five-year term contract. ■

Fast-packet services

US WEST pulls out of SMDS mart

By Tim Greene

US WEST, Inc. is getting ready to pull the plug on its SMDS offering — a move that could be a harbinger of things to come for the connectionless, high-speed service in other regions.

US WEST, which has offered Switched Multimegabit Data Service since 1992, is dropping the service April 1. However, the carrier will continue supporting its entire SMDS customer base — two users in Minnesota.

US WEST is considered one of the most aggressive regional Bell operating companies when it comes to data services, so its dumping SMDS could portend a similar fate elsewhere, said Rick Malone, principal at Vertical Systems Group in Dedham, Mass.

US WEST said its alternative offering — Transparent LAN Service — met similar user needs and sold better than SMDS.

Other RBOCs said they are standing by SMDS but are clearing the way for customers to migrate to Asynchronous Transfer Mode. Ameritech Corp., for

example, has set the establishment of SMDS-to-ATM interworking as a goal for this year, according to Kimberly Price, Ameritech senior product manager for fast-packet services. Ameritech has about 80 SMDS customers in its five-state region, she said.

MCI Communications Corp., with about 130 SMDS customers, said it would offer SMDS-to-ATM interworking in the third quarter.

SMDS, typically available in speeds from 64K to 45M bit/sec, lets any site on a network connect with any other site.

The virtues of SMDS include being connectionless — not needing permanent virtual circuits — which, in turn, makes it easier to add sites than it would be for a frame relay network. Despite those advantages, SMDS has its drawbacks, including that it can handle only data.

The U.S. market for SMDS in 1995 was \$21 million, Malone said. For frame relay, it was \$556 million. ■

Open Market software separates Web content, transaction management

By Ellen Messmer

Cambridge, Mass.

Open Market, Inc. last week introduced a pair of products that will let companies set up centralized servers for authenticating users or processing payments across the Internet and intranets.

OM-Transact is server software designed to let companies selling goods on the Internet manage orders. The software, which works with any standard World-Wide Web server, can be configured to accept orders, process payments and set up on-line accounts from a central location, serving customers buying merchandise from multiple Websites.

OM-Transact separates the management of Web content from the management of the transaction, said Bob Weinberger, Open Market's vice president of marketing. That makes transaction processing more efficient, he said.

With OM-Transact, the merchant embeds special URLs called digital offers

in Web content that refers to merchandise being sold. So when customers click on a button to make a purchase, they are redirected automatically to the OM-Transact server. From this central location, custom-

ers' credit card processing or other order procedures are handled.

Optional OM-Transact modules add sales tax processing, fax and electronic data interchange capabilities.

Open Market has also announced a Web authentication server called OM-Access for controlling access to restricted Web content on corporate Web intranets.

End users wanting access to such content is first directed to the OM-Access

server, which challenges end users to authenticate their identity through questions or a check of their IP address. Once approved by OM-Access, the end users are issued a ticket — an encrypted hash digest — to access the content for a predetermined period.

OM-Transact costs \$250,000, and OM-Access costs \$35,000. Both are expected to ship in April.

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Open Market's
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Oracle and Compaq to help users try servers on for size

By Ben Heskett

Redwood Shores, Calif.

Oracle Corp. and Compaq Computer Corp. are readying software for release this summer that will help customers determine how big a server they need to run their database software.

The Oracle System Sizer helps size the appropriate server for companies running Oracle7 on-line transaction processing applications on NetWare-, SCO OpenServer- or Windows NT-based servers from Compaq.

The software helps customers make their decision by asking them questions about the number of end users, database size, fault-tolerance level, peak usage duration and the kind of transactions being processed.

Based on the results, the software recommends the CPUs, memory and disk drives needed on the server.

In addition, a company can change the parameters of the network to see how hardware needs would change using maximum cache hit rates and maximum system usage statistics.

Besides working with Compaq, Oracle is talking to Digital Equipment Corp. about offering the software with its servers.

Pricing information was not available. ■

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Briefs

■ **Cisco Systems, Inc.** announced **two routers** that feature integral data service units/channel service units. The 2524 and 2525 models are priced at \$900 and \$1,400, respectively, and are available now.
Cisco: (408) 526-4000.

■ **General DataComm, Inc.** cut prices last week on its 32-port Apex-MAC and 16-port Apex-MAC1 Asynchronous Transfer Mode access devices. Apex-MAC dropped from \$18,000 to \$12,000, and Apex-MAC1's price was halved to \$6,000. The devices concentrate Ethernet, frame relay, circuit emulation and video traffic onto T-1, T-3 or OC-3 cellstreams.

■ The New York City Department of Information Technology and Telecommunications is reportedly using New York-based WinStar Communications, Inc.'s "wireless fiber" system as a backup for voice and data communications traffic. The city has installed seven T-1s of the wireless local-loop alternative, designed to kick in during disasters and unplanned outages.

■ **Bell Atlantic Corp.** said it has set up a Network-to-Network Interface (NNI) with regional long-distance frame relay service provider EMI Communications Corp. NNI is the Frame Relay Forum's standard specification for allowing frame relay switches on different networks to exchange data packets, and customer and billing information.
The Bell company said its 56K bit/sec-to-T-1 NNI linkages with Syracuse, N.Y.-based EMI will let users create one big frame relay network throughout Bell Atlantic's territory.

■ **PCS Development Corp.**, one of the nation's five narrow-band personal communications services (PCS) spectrum license holders, said it has signed a memorandum of understanding with TSR Paging, Inc. whereby TSR will offer PCS Development's two-way voice messaging services to its 600,000 subscribers in the Northeast. The service is expected next year.

Adtran extends reach of ISDN

Company's new Total Reach device is a shot in the arm for dial-up digital service.

By Tim Greene
Huntsville, Ala.

Adtran, Inc. has found an answer to what has been a major obstacle to widespread ISDN availability: insufficient range.

The problem is that ISDN can reach only 18,000 feet and then needs a costly repeater. But Adtran's Total Reach increases the range of a line to 30,500 feet without a repeater, increasing the service area of an ISDN-equipped central office by 70%.

US WEST, Inc. said the device could mean cutting the percentage of its ISDN Basic Rate Interface lines that need repeaters from 15% to 5%. Pacific Bell said the product would cut its need to use repeaters from 30% to between 6% and 10%.

"This will definitely help,"

said Tim Baylis, director of switched services for Pacific Bell.

Recently in California, the cost of adding repeaters was partially blamed for a proposed rate hike by Pacific Bell (NW, Jan. 22, page 21). According to Adtran, once Total Reach is in full production, it will cost about \$600 for the hardware to provision one ISDN line to 30,500 feet.

Hardware for a repeater costs about \$1,800 plus another \$700 or so to install it, a US WEST spokesman said.

"This would make it much more cost-effective for RBOCs to service customers with ISDN," said Michael Smith, an analyst with Datapro Information Services Group in Delran, N.J.

"There are two exciting parts: It increases the accessible mar-

ket and it significantly reduces the cost," said Scott Berman, an ISDN manager at US WEST.

Good timing

The product comes at a critical point for ISDN, when cable TV providers are close to offering digital services using cable modems and phone companies are weighing whether to offer Asymmetric Digital Subscriber Line—technologies that can offer much higher bandwidth than ISDN.

"ISDN needs to be deployed rapidly over the next 12 months. If not, cable modems will offer a compelling alternative solution," Smith said.

Adtran's Total Reach might not be the only solution. Pacific

Read up on Pacific Bell's proposed ISDN rate hike in California — and on efforts to fight it — on Network World

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Bell's Baylis said the company is working on its own solution that might be even less expensive. Total Reach, however, looks like a good interim measure, he said.

Total Reach reduces the loss of power of the ISDN signal in the copper wire and increases the tolerance for noise on the line, according to Adtran Chief Executive Officer Mark Smith.

The product consists of a central-office card that is compatible with switches from AT&T, Northern Telecom, Inc., Siemens Rolm Communications, Inc. and other companies, and a network interface unit that would be installed on the customer premises.

Adtran said it had turned over samples of Total Reach to NYNEX Corp., Bell Atlantic Corp., US WEST and Pacific Bell for testing and review.

Limited production of the units will start in the third quarter for about \$1,000 per circuit. As volume ramps up, the price will drop to \$600, Smith said.

©Adtran: (205) 971-8000.

Bay Networks offers remote access roundup

By Jim Duffy

Santa Clara, Calif.

Bay Networks, Inc. last week announced new and enhanced products designed to provide users with an end-to-end remote access solution.

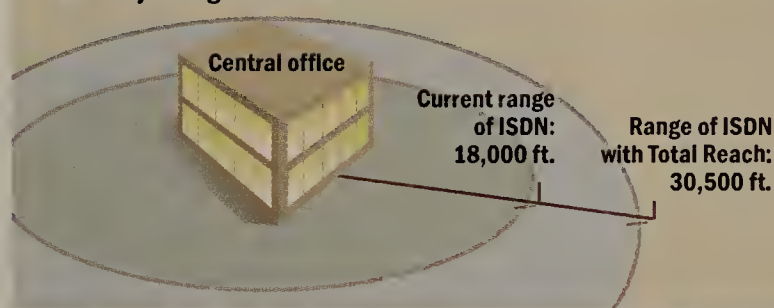
Product extensions feature ISDN Basic Rate Interface and Primary Rate Interface support across Bay's routers, including high-density PRI aggregation of multiple remote site ISDN channels; hardware- and software-based data compression; and WAN services for Windows NT servers.

For its line of Backbone Node routers, Bay rolled out a four-port ISDN PRI/T-1 link module that enables the routers to support as many as 48 ISDN PRI interfaces for concentration of multiple remote site ISDN links. Also, Bay unveiled an eight-port synchronous link module for the Backbone Node that enables the router to support as many as 104 synchronous WAN ports running at up to T-1 speeds.

Bay's Access Stack Node,
See Bay Networks, page 20

Extending the arm of ISDN

Adtran's Total Reach will let carriers significantly increase the area served by a single ISDN switch.



Platinum enhances management automation, billing performance

By Jim Duffy

Oakbrook Terrace, Ill.

Platinum Technology, Inc. has unveiled software to enhance automation, performance and chargeback management in enterprise networks.

The company rolled out two new applications and an application suite intended to help users get a grip on the systems and network management requirements of their heterogeneous environments.

For automated management operations, Platinum released AutoAction, which automatically processes events and executes tasks required to maintain application and system uptime.

AutoAction recognizes, prioritizes and acts on events based on predefined criteria.

Today, if a company's CICS system log fills up, transaction processing will be suspended until the error message is

received by the network operator and the problem is resolved. But with AutoAction, the error message is instantly identified and CICS is automatically switched to an alternate log. Users are never interrupted, Platinum claims.

"We needed a way to monitor and control job scheduling across the enterprise," said AutoAction user Frank Heilig, project leader at the University of Pennsylvania in Philadelphia. "When we installed the automated scheduling, we actually finished [processing] about three hours earlier than we used to. We took all of the manual bottlenecks out... and reduced the amount of scheduling errors dramatically, probably by 99%."

AutoAction runs on Windows NT, Unix, OS/400, VSE and MVS systems. It is priced from

See Platinum, page 20

PLATINUM SELLERS

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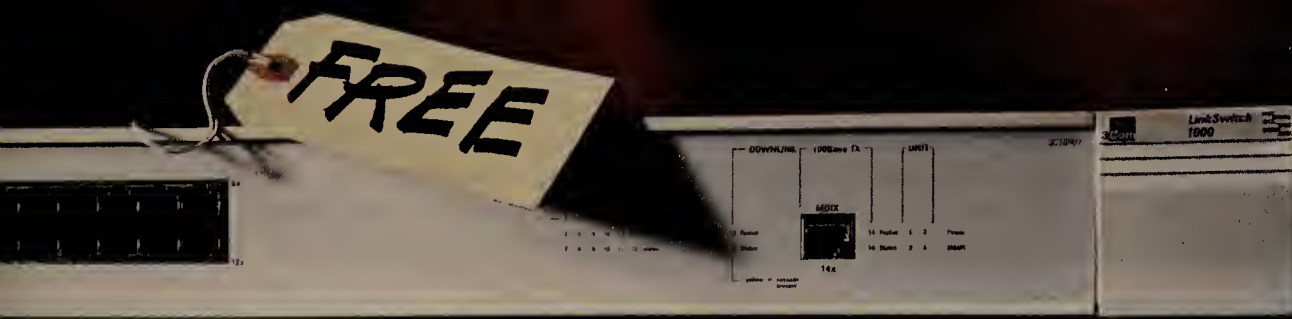
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Attachmate sends Emissary to mainframe

By Michael Cooney
Bellevue, Wash.

Attachmate Corp. last week took a dive into the highly competitive LAN-to-mainframe channel gateway market with a product that promises to ease SNA-to-TCP/IP migration efforts.

The company's Emissary TCP Server will let SNA users consolidate existing gateways, while allowing high-speed access to mainframe resources over a TCP/IP backbone (NW, Feb. 26, page 6).

"The Emissary TCP Server lets users quickly deploy SNA applications on TCP/IP networks. Plus, it handles all of the tn3270 processing and doesn't require TCP/IP on the host," said Michael Callahan, director of product marketing for Attachmate.

Emissary TCP Server is a 32-bit software package that runs on Microsoft Windows NT Server.

Residing between the mainframe and downstream TCP/IP nets, it can direct SNA traffic to as many as 20 IBM mainframes and support 2,000 tn3270 users.

Any industry-standard tn3270 software package, which lets SNA clients communicate over TCP/IP nets, can link to Emissary. It supports Attachmate Extra clients, as well.

Attachmate will resell Polaris Communications, Inc.'s bus-and-tag mainframe channel card, which slides into any Pentium PC platform to channel-attach the Emissary to the mainframe.

This gives users access to the 4.5M byte/sec channel on the mainframe.

Emissary can also be linked to the mainframe via a token-ring or 64K bit/sec Synchronous Data Link Control connection.

Most observers said Attachmate faces a stiff battle for this

market, going against heavy hitters such as IBM, Microsoft Corp. and Cisco Systems, Inc. And the firm still must contend with its traditional competitors such as Apertus Technologies, Inc. and CNT/Brixton.

Attachmate is undaunted.

"We have over 35,000 SNA gateways installed already, and we have those users telling us they want a way to migrate to TCP/IP. That's what we're doing," Callahan said.

Emissary TCP Server costs \$11,500 for 250 users. A 2,000-user license costs \$65,000. The mainframe channel adapter costs \$15,000, and an SDLC adapter sells for \$1,345.

©Attachmate: (206) 644-4010.

Platinum

Continued from page 17

\$4,500 to \$45,000 and is available now.

Performance is the word

Platinum's enhanced performance management capabilities, meanwhile, are embodied in a new version of its Enterprise Performance Management (EPM) product suite. The suite includes agent software for Informix, Oracle and Sybase databases and Unix servers, and will soon include a net service-level transaction monitoring tool.

Enhancements in EPM Version 3.0 include support for Simple Network Management Protocol for integration with

leading network management platforms; more detailed information gathering; high-performance storage of historical data; three-dimensional graphing of data from multiple sources; and data interpretation tools that are available in every graphic window.

EPM 3.0 costs between \$1,400 and \$8,000, and is available now.

Lastly, Platinum announced CIMS, a chargeback application that collects workload usage data from various platforms and produces cost-recovery reports. Users are then charged for the information resources that they consume.

CIMS is priced from \$12,000 to \$25,000 and is available now.

©Platinum: (708) 620-5000.

WAN MONITOR

What's all this about ADSL?

In this Internet age, everyone seems to want information quickly, directly and cheaply. So how will it all be done?

Well, you've already heard about 10M bit/sec cable modems and ISDN, of course. But a little-known yet highly promising technology in the high-speed Internet access race is Asymmetric Digital Subscriber Line, or ADSL.

The beauty of ADSL is that it delivers needed speed over standard copper wires, making it ideal for residential and work-at-home environments.

Fact is, there's a whole lineup of technologies dealing with digital subscriber lines that offer high-speed services over existing copper facilities, including:

■ ADSL, which offers up to 6M bit/sec downstream and 640K bit/sec upstream — ideal for most data and Internet applications.

■ New symmetrical variants (dubbed Symmetrical Digital Subscriber Lines) will offer full-duplex 1.5M bit/sec in the local loop, just like a regular T-1, by the end of this year.

■ Very high Digital Subscriber Link, or VDSL, which provides up to 51M bit/sec downstream capacity for distances of less than 500 feet.

In some ways, ADSL is like the next generation of high-speed modem technology, but instead of talking about a jump from 14.4K to 28.8K bit/sec, we're talking about an increase of several thousand percent!

ADSL involves installing two modems on each end of a standard single-pair copper trunk. It's quickly deployable (quicker than digging up streets and laying fiber, that is); flexible (today's CPE is being developed to allow for software downloads to reconfigure the CPE with different bandwidth levels); and portable (if it doesn't work in one area, move it to the next).

Given that copper cabling encompasses more than 95% of the nation's local phone lines, it's also quite compatible with what's in the ground today. As a result, ADSL is very attractive right now to the telcos, which are collectively seeking a viable, quick and effective weapon against cable companies.

Any downsides? Well, it's not deployed yet. Bell Atlantic and GTE are on the leading edge of this; US WEST, PacBell and Ameritech bring up the next tier, followed by NYNEX and SBC.

And we'll probably see Internet access options from Bell Atlantic and GTE this year, and maybe from US WEST.

There are still technical and cost issues that must be overcome before widespread ADSL deployment is feasible.

The ADSL vendors are working to resolve the standards issues so that it will be possible to connect one ADSL vendor's premises modem to another vendor's central-office equipment.

Meanwhile, market research suggests that the high-speed Internet access market could explode if prices drop to \$50 per month. The challenge then to ADSL vendors would be to make equipment that fits this model. But they'd better get on with it. Otherwise, ADSL will suffer the same fate as ISDN, becoming affordable and widely available only after its throughput is too small to get excited about.

ADSL and cable modem technologies are expected to put competitive pressures on ISDN and other services that target Internet access and the small office/home office market. At the same time, telcos will struggle to maintain a balance between delivering new services in a highly competitive market and maintaining a highly profitable installed customer base from existing services. You can play a role in accelerating the deployment of these new technologies by expressing your needs for low-cost, high-speed services to your local providers.

The bottom line is that ADSL provides a lot of food for thought about how applications like the Internet and remote LAN connectivity could be handled in the future. If you'd like more information, visit our World-Wide Web site at www.telechoice.com/xdslnewz/.

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at danny_briere@telechoice.com or christine_heckart@telechoice.com.



Daniel Briere and Christine Heckart

Bay Networks

Continued from page 17

meanwhile, now sports a four-port ISDN BRI module.

For the Xylogics Nautica line, Bay rolled out a voice card for Xylogics' Clam router that allows users to send fax and voice over the same line, as well as an integrated NT1 device that enables direct connection to ISDN lines. The company also unveiled an ISDN PRI module for the Nautica Marlin router. The Nautica line can now interoperate with Bay's Backbone Node and Access Stack Node routers using the Multilink PPP.

Users can aggregate up to 16M bit/sec of compressed throughput per router chassis slot, according to Bay.

Also, Bay will provide WAN

access for Windows NT servers acting as file servers and routers. To do this, Bay will resell Eicon Technology, Inc.'s WAN Services for NT software, multiservice access cards and client- and server-based ISDN BRI adapters.

The four-port ISDN PRI module for the Backbone Node costs \$12,000, and the eight-port synchronous module costs \$7,500. The four-port ISDN BRI modules for the Access Stack Node cost \$2,000. The voice card and NT1 enhancements put the price of the Clam at \$1,395 and \$1,195, respectively.

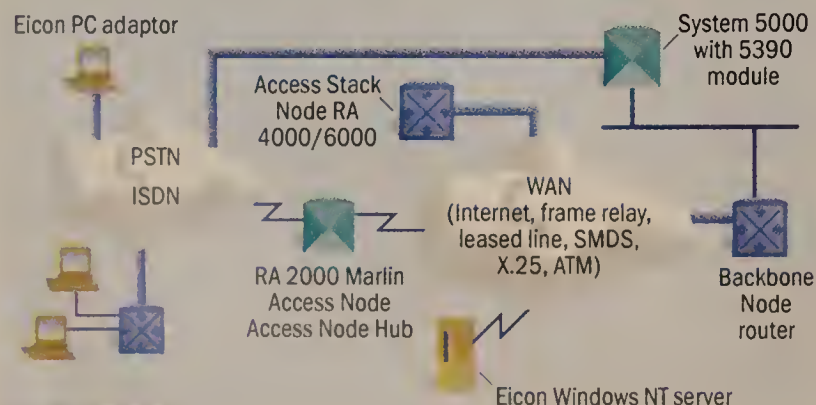
The Marlin with ISDN PRI support costs \$7,295. The compression coprocessor for the Backbone Node starts at \$3,000.

All products will be available in the second quarter.

©Bay: (408) 988-2400.

Access from end-to-end

Bay's new access products and resale agreement with Eicon Technology are designed to provide users with end-to-end net access.



GRAPH BY TERRI MITCHELL

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TELECOMMUTING

The myriad hidden costs of telecommuting

By David Rohde

If your company is considering a serious commitment to telecommuting and wants you to provide networking support, ask yourself this one question: Are you allergic to cost overruns?

If you are, it's well worth your time to examine the hidden costs lurking behind the warm and fuzzy facade of telecommuting, one of the most widely misunderstood phenomena of the 1990s workplace.

Hidden costs range anywhere from the subtle, such as the performance degradation of data applications over telephone lines, to the prosaic, such as telecommuters' tendency to rack up outside copying and fax charges.

In fact, an understanding of who most telecommuters are — not full-time home workers, but rather part-time telecommuters who also demand network resources at the office — helps put the problem into perspective.

"The vast majority fall into

the category of casual, after-hours telecommuters," according to a 1995 report by Forrester Research, Inc.'s Network Strategy Service (see story, this page).

Take a glance at almost any independent cost-benefit analysis of telecommuting and you'll no doubt find that employers come out on top.

Then take a closer look. You'll probably find that such an analysis works only by assuming workers at home are more productive than they are at the office.

Sneaky long distance

Calculating the costs of both voice and data connections back to the office can be one of the biggest areas to trip you up.

Network managers often assume that telecommuters will reside within the company's local calling area. As a result, they figure that analog connections will either be on a flat rate or on the type of concentric-zone measured rates common in California and some other areas.

But that fails to take into account the fact that individuals and families now are settling further out from many city centers than ever before. That frequently puts them into regions that are still within, say, a regional Bell operating company's territory but outside the local calling area, thus invoking either long-distance tolls or what some RBOCs label "metro lines," which incur additional monthly fees.

Phone lines can also be a problem. Graham Holmes, product marketing manager for Cubix Corp. in Carson City, Nev., noted from personal experience that workers who already have two phone lines at their homes may face additional installation costs.

"I had used up the existing two pair of wires in my house with two other analog lines, so I needed to put in a cable run from the street edge

to my house," Holmes said.

Since many telecommuters are just after-hours zealots — or "weekend warriors" — many companies do not establish a separate telephone line for them. But that forces the worker's outgoing voice calls and data connections to be made at higher residential long-distance rates and typically results in a reimbursement headache as the worker and your accounting department sort out business and personal calls.

Dial up more telecommuting info on Network World Fusion (<http://www.nwfusion.com>), including:

Primers on setting up telecommuting programs

Sample employee policies and needs assessments

Select News+, then WANs & Internetworking.

Companies with virtual private network (VPN) calling plans can provide a workaround by asking home workers to simulate being on the road and use their VPN calling cards when they make calls. But that involves numerous extra dialed digits and still results in calling card surcharges above the company's discount VPN calling schedule.

AT&T is now addressing this need by providing a special feature on its Software Defined Network (SDN) called the Virtual Office Connection. This feature substitutes the automatic number identification of the worker's home telephone number for the calling card identification code. When the employee dials the 800 number for SDN remote access, the AT&T network automatically recognizes the user through the ANI and immediately prompts the employee for the outgoing telephone number.

Tricky bandwidth management

Whether or not the telecommuter gets a separate telephone line, most consultants suggest you provide an ISDN interface or one of the fastest available modems — those that operate at 28.8K bit/sec. But they add that it's best not to calculate expected network usage based on such a speed since some telephone companies privately tell users not to expect better than 14.4K bit/sec performance.

Watch out also for cost traps in the application software run-

ning across WAN links to telecommuters. The Forrester analysts especially caution against cost run-ups when users employ 1980s database products such as Paradox and dBase since they are very slow over remote LAN connections.

And intranet projects based on applications originally developed for NetWare networks supporting Novell, Inc.'s IPX can also boost telecommunications charges when extended to telecommuters. "Solutions which encapsulate IPX within IP have the drawback of slowing applications to a crawl," analysts said.

Finally, assess the hidden costs on you and your staff, analysts suggest. Telecommuting programs can be every bit as rigorous a project as internal upgrades, with new strains on network management

Burning midnight oil and corporate dollars

At-home costs incurred by office-based "white-collar workhorses" putting in overtime hours at home vs. classic telecommuters:

For white-collar workhorses:		
Type of cost	Onetime cost	Annual cost
Support	\$200	\$385
Network	\$20	\$156
Home setup	\$3,816	\$565
Corporate setup	\$108	\$16
Total	\$4,144	\$1,122

For home-based telecommuters:

Support	\$500	\$347
Network	\$203	\$1,282
Home setup	\$3,522	\$494
Corporate setup	\$237	\$35
Total	\$4,462	\$2,158

Home setup assumes the purchase of a new PC but does not include non-IS costs such as home furnishings and insurance.

SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS.

and also with unique requirements to interface with the accounting, legal and human resources departments of your firm. ■

HARD DOLLARS, SOFT DOLLARS

Costs and benefits per person of a 20-person telecommuting pilot project:

Costs

Identifying existing teleworking situation	\$40
Doing a cost/benefit analysis	\$60
Choosing teleworkers	\$1,000
Training teleworkers	\$60
Training managers	\$25
Counseling households	\$150
Designing offices	\$375
Furniture and equipment	\$5,000
Legal costs	\$60
Measuring and monitoring	\$900
Additional energy allowance	\$400
Employees' time preparing to telework	\$2,250
Total costs per person	\$10,320

Benefits

Reduced office space costs	\$5,000
Increased output*	\$11,000
Total benefit per person	\$16,000
Net benefit to employers (total benefit minus total cost)	\$5,680

* Increased output is derived from assuming an \$11,000 additional "average contribution to gross revenue" per person to the company.

SOURCE: GRAY, HODSON AND GORDON. *TELEWORKING EXPLAINED*

Part-time but just as expensive

Besides being called upon to establish network connections for hundreds of full-time home workers, you may also be forced to deal with the reality of in-office employees who are also overtime telecommuters.

In a study of Fortune 1,000 firms conducted last year by Forrester Research, Inc., 62% reported that they have at least 50 work-at-home employees. But of those workers, only 11% were daytime, home-based workers — the type usually conjured up by telecommuting advocates. The other 89% were after-hours workers, those who extend the workday to evenings and weekends.

Labeled "the white-collar workhorse," he or she is more widely accepted by corporations than daytime home workers, Forrester analysts said. "This zealous employee squeezes in a few more work hours at night, on the weekend and after travel," they said.

But the white-collar workhorse is hardly less costly to support just because he or she is not a full-time telecommuter. Forrester's study found that both managerial workaholics and real telecommuters cost more than \$4,000 to set up (see graphic).

Home-based teleworkers do rack up ongoing expenses that are twice as large, mostly because they account for more carrier toll charges.

But Forrester said even the average white-collar workhorse costs more than \$1,000 a year to support, over and above the costs and telecommunications charges they rack up at the office.

While there is a lack of well-established corporate work-at-home programs, Forrester found one exception: the rapidly growing number of telecommuting call center agents.

These telephone agents get 800 calls routed to them either through premises-based automatic call distributors (ACD) or directly from long-distance carriers through pre-established routines.

Why is this so popular? Because a call center agent's performance is easily measured. In fact, by reading ACD reports, call center supervisors can determine the exact productivity of their work-at-home groups.

—David Rohde

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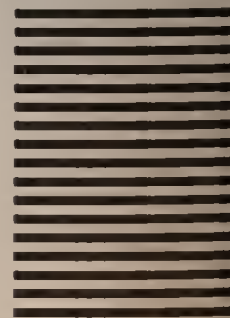
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Local Networks

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Briefs

■ **Microsoft Corp.** has raised the rates on its round-the-clock **Premium Support service** and has added several enhancements. The price jumped from \$25,000 to \$40,000 per year, but the new program includes support for beta products and Premier Service Desk, a World-Wide Web site on which users can report problems and search technical documents. For a \$5,000 setup fee and \$6,000 per year, Microsoft also will remotely monitor a customer's Windows NT Server to sniff out developing problems.

Microsoft: (206) 882-8080.

■ **CallWare Technologies, Inc.** last week announced a module for its **computer-telephone integration** software that gives users two-way voice messaging over the Internet. Users on the road can dial in to an Internet address representing a CallWare server, which will query the private branch exchange as well as display voice and electronic mail messages on a single menu. Users can click on a voice mail message and have the file downloaded and played on a speaker on their PC. They also can record a voice mail message and send it as E-mail to a PBX, where it will be inserted into the voice mail system.

CallWare: (801) 486-9922.

■ **Texas Instruments, Inc.** last week unveiled a new Ethernet processor, dubbed **ThunderSwitch**, that will allow LAN switch vendors to build switches that support advanced features such as **virtual LANs** and built-in Remote Monitoring, but at the price of repeaters.

■ **LANart, Inc.** in Needham, Mass., has enhanced its Ethernet switch by providing a new load-balancing feature that can be used to set up automated virtual LANs. SegWay Traffic Manager allows net managers to boost performance by automatically allocating user traffic across specified Ethernet switch ports.

Pricing for the management software starts at \$80 per port. It will be available in April.

LANart: (800) 292-1994.

Start-up Ethernet switch maker plays up pricing

By Jodi Cohen

Start-up Acacia Networks, Inc. last week made its debut with a stackable Ethernet switch that offers key management features and costs just \$250 per port.

The base NovaSwitch workgroup device comes configured with 16 or 24 switched 10Base-T ports and features three expansion slots.

Customers can fill the slots with two-port 100Base-T, eight-port 10Base-T and one-port

FDDI uplink modules for added port density or server and backbone connections.

The 24-port switch, for example, can be expanded to support six switched 100Base-T ports or fully loaded with as many as 48 switched Ethernet ports. Both versions support as many as 5,000 media access control addresses.

Customers will also be able to use the expansion slots for a StackPlane module that enables up to seven units to be stacked

LAN switch niche

Company	Product	Price	Availability
Acacia	NovaSwitch Ethernet switch	Starts at \$4,495	June
Acacia	Expansion modules	Starts at \$995	June
Whitetree	25M bit/sec ATM switch	\$6,995	April
Whitetree	155M bit/sec ATM switch	Starts at \$800 per port	Early 1997

and an Advanced Management Module for complete Remote Monitoring (RMON) support.

A 155M bit/sec Asynchronous Transfer Mode module will be added in the future to provide connectivity to ATM switches.

Acacia's switch supports built-in RMON capabilities for gathering statistics, alarms, events and

historical information. Also, the switch offers a sophisticated set of LEDs that provide information on transmissions, collisions and errors, as well as bandwidth utilization, RMON events, packet throughput and buffering. The device can be managed via any Simple Network Management Protocol-based management application.

The NovaSwitch will go up against similar workgroup switches from Cisco Systems, Inc. and 3Com Corp., yet sell for about half the price.

"[Acacia] is talking about bottom, dirt-cheap prices, and the box looks pretty interesting," said Charlie Robbins, vice president of communications research at Aberdeen Group, Inc., a consultancy in Boston. "But the question is if they can survive the acquisition craze happening in the LAN switch market."

Whitetree's workgroup wares

Separately, Whitetree, Inc. last week rolled out a 12-port 25M bit/sec ATM switch that supports as many as four 155M bit/sec ATM links for server or backbone connections.

The device is designed for pure ATM workgroups. It can be used alone or in conjunction with the company's Ethernet-to-ATM switch.

Looking ahead, Whitetree plans to deliver a 16-port 155M bit/sec ATM switch that will switch traffic between Ethernet and 25M bit/sec ATM switches, as well as provide links to servers and backbone nets. Included will be a T-1 module for wide-area connectivity.

©Acacia: (617) 937-1784; Whitetree: (415) 855-0855.

Software management steals the spotlight

By Ben Heskett

Mountain View, Calif.

While Symantec Corp. updated its popular LAN management utility last week, SunSoft, Inc. introduced a new tool aimed at a similar market niche.

SunSoft's new software management product, dubbed PC Software Director, is intended to ease the management of PC clients linked to Solaris servers.

The offering allows an administrator to conduct an inventory of PC software and hardware, distribute applications based on the results of the inventory and view application usage on each desktop. The software communicates via server and client agents.

PC Software Director 1.0 supports DOS, Windows 3.X and

Windows 95 clients. Support for Novell, Inc.'s NetWare clients is expected soon. The product supports TCP/IP, IPX/SPX, NETBIOS/NETBEUI and Network File System networking protocols.

SunSoft also will announce late this month a server-based messaging service for Solaris that allows users to seamlessly send messages between different electronic mail systems, such as cc:Mail or Microsoft Mail.

Symantec's Internet bid

Separately, Symantec last week introduced a version of its Norton Administrator for Networks (NAN) that adds native IP addressing capability and Desk-

top Management Interface (DMI) compliance.

The IP support — achieved through a WinSock-compliant TCP/IP stack — means that NAN's application metering, software distribution, and hardware and software asset management functions can be performed across the Internet.

NAN 2.5 also includes software metering for 32-bit applications, which is a requirement given that many companies have installed Windows 95, according to John Niednagel, senior product manager for Symantec.

DMI compliance makes asset management inquiries more accurate and complete since the DMI specification covers numerous server and desktop models, as well as modems and printers.

Previously, asset management utilities included proprietary code to read each product. Therefore, the coded library of products embedded in the software often was not complete.

Symantec rival McAfee also bulked up its management product arsenal with an Internet-enabled program for storage management, dubbed WebStor. In addition, the company unveiled SaberTools 6.0, a client and server management suite combining tools from McAfee and Saber Software, Inc., which McAfee bought last year.

©SunSoft: (800) 786-7638; Symantec: (800) 441-7234; McAfee: (408) 988-3832.

LAN management medley

Company/product	Description	Price	Availability
McAfee/WebStor 1.0	Internet-enabled backup tool for Windows 95 and NT	\$65	April
McAfee/SaberTools 6.0	Suite of configuration management utilities for NetWare and Windows NT	From \$38 per node for 50 nodes to \$26.60 per node for 1,000 nodes	March 25
SunSoft/PC Software Director 1.0	Application and asset management for Windows desktops in Solaris server environments	Server: \$499; client: \$545	Now
Symantec/Norton Administrator for Networks 2.5	Desktop management software for Windows 95 and NT	From about \$58 per node for 10 licenses to \$44 per node for 1,000 licenses	March

Download a draft specification for benchmarking Ethernet switches from Network World Fusion (<http://www.nwfusion.com>).

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IRED WINDOWS

Dave Kearns



Win95-to-NetWare communications breakdown

Those of you who've been testing and implementing Windows 95 will have discovered that a Windows 95 PC running Novell, Inc.'s Client32 for Windows 95 will not communicate with another Windows 95 PC running Microsoft Corp.'s File and Print Services for NetWare.

There has been much speculation that this was done deliberately by Novell because Microsoft built File and Print services without input from Provo.

Novell, however, says it's Microsoft's implementation that's flawed, either by design or through incompetence.

Microsoft says that File and Print ser-

vices make the Windows 95 PC appear as a NetWare 3.12 server. When another PC queries the Windows 95 machine as to its NetWare version, it responds with: 3.12.

But here's where it gets murky, so I'll quote from a Novell engineer to get it straight:

"Then Client32 tries to communicate with the Windows [NetWare Core Protocol] Server using Novell's Case 87 NCP set, which all real NetWare 3.X and 4.X servers can use in a client/server situation. Because Microsoft's NWSERVER software doesn't support these basic NCPs, the communication fails.

"For Microsoft to resolve this issue, it would need to respond to the client with: NetWare 2.2. From here, Client32 would then know to use the older Case 22 NCPs, which NetWare 2.2 uses to communicate to NetWare clients."

Interestingly, Novell's own NetX and virtual loadable module (VLM) clients have no problem communicating with the Windows 95 pseudoserver. VLM was released with NetWare 4 and shipped with NetWare 3.12, so you would expect that it should be able to distinguish between different NCP calls, wouldn't you?

Some of you may remember or use a product from Ornetix called Servview (or its later implementation Diskview) that allowed you to turn a DOS-based PC into a NetWare 2.2 server clone. Its implementation is remarkably similar to Microsoft's File and Print services, except it advertises itself as a 2.2 server. I haven't tested this personally, but I'd expect it would be accessible by the Client32 software.

So did Microsoft stumble, identifying a NetWare 2.2 clone as a Version 3.12 work-alike? Did Novell deliberately find a way to block the usefulness of Microsoft's File and Print services?

I don't know and doubt we ever will.

Tip of the week

Microsoft used a new file compression method for Windows 95 distribution disks that is called Cabinet files (identified by the .CAB extension). You can use the EXTRACT.EXE utility shipped with Windows 95 to retrieve a single file provided you know which Cabinet file it is in and its full name. But a better choice is CABVIEW, which graphically shows the contents of the .CAB file, allowing you to point and click to retrieve one or more files. Get it off the Web at <http://www.win95.com>.

What it does point out, however, is that software vendors are marketing-driven rather than customer-driven. What they do is try to maximize income for shareholders. They'll do this by telling you that they provide the one tool that all network administrators absolutely have to have.

If, in passing, they actually provide you with a useful tool, it's fortuitous.

Kearns, a former net administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.



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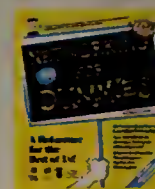
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NET RESULTS

Acquisition wave crashes on net management shores

Hold onto your seats, folks, and get ready to weather the fourth major internetworking acquisition storm of the last two years.

First, LAN switch vendors were gobbled up. That was followed by a rush on ATM vendors and, recently, a move on remote access providers.

After acquiring all that technology, vendors looked around and realized they had awesome product portfolios but little in the way of network management to support their new satchel of goodies. And the reaction from users was crystal clear: "If I can't manage it, I ain't putting it in."

So the acquisition scramble has begun anew with vendors focusing on the hottest management technology in the industry: Remote Monitoring (RMON). 3Com Corp. last week snatched Axon Networks,

Inc., while Bay Networks, Inc. bought Armon Networking, Ltd. the week before.

RMON allows LAN managers to gather network statistics and monitor traffic parameters in a variety of areas. It's generally accepted that the thorny issue of providing management in switched environments begins with RMON.

In the case of 3Com and Bay, they were merely going a step beyond existing partnerships they had with the companies they were acquiring. But why buy something if you already have a license to access it? The reason is network management is quickly becoming a differentiator, and buying something outright means you can block your competitors from getting their hands on it.

While outright ownership can always be viewed as an advantage for a vendor because it gives the company development control over a product, it is especially critical in the net management area.

Management of switch-based networks is inherently more difficult than that of shared-media environments. With switching, connections are built on a point-to-point basis, so you can no longer drop an analyzer or RMON probe onto a wire to cull traffic statistics for the entire device.

Users have several options for managing switches using RMON. They can monitor one segment at a time by moving a probe from one port to another via software (also known as port mirroring). They also can invest in a switch with a common backplane that can be probed.

A third option is to embed the RMON technology on each port of a device — a potentially expensive solution, but one that appears to be the ultimate goal. Cabletron Systems, Inc., for example, has been using this approach quite effectively across its entire product line — and not charging for it. Embedding the technol-

ogy may be the most cost-effective scheme in the long run because it reduces the need for stand-alone probes and builds the capability into your network in a relatively seamless fashion. Embedded RMON is quickly becoming a checklist

feature in LAN switches. Users should quiz their suppliers carefully on how RMON is being offered, what is required for a complete implementation and what the price structure is.

RMON, however, is just the proverbial

tip of the iceberg. Users can expect more acquisitions in the network management area as vendors scramble to secure virtual LAN software and bulk up their element management offerings.

Le Baron is a research director and MacAskill a senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. Contact them by E-mail at inquiry@gartner.com or at (203) 316-1111.



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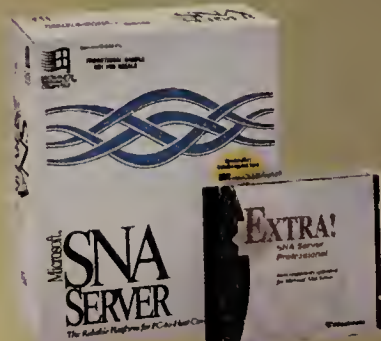
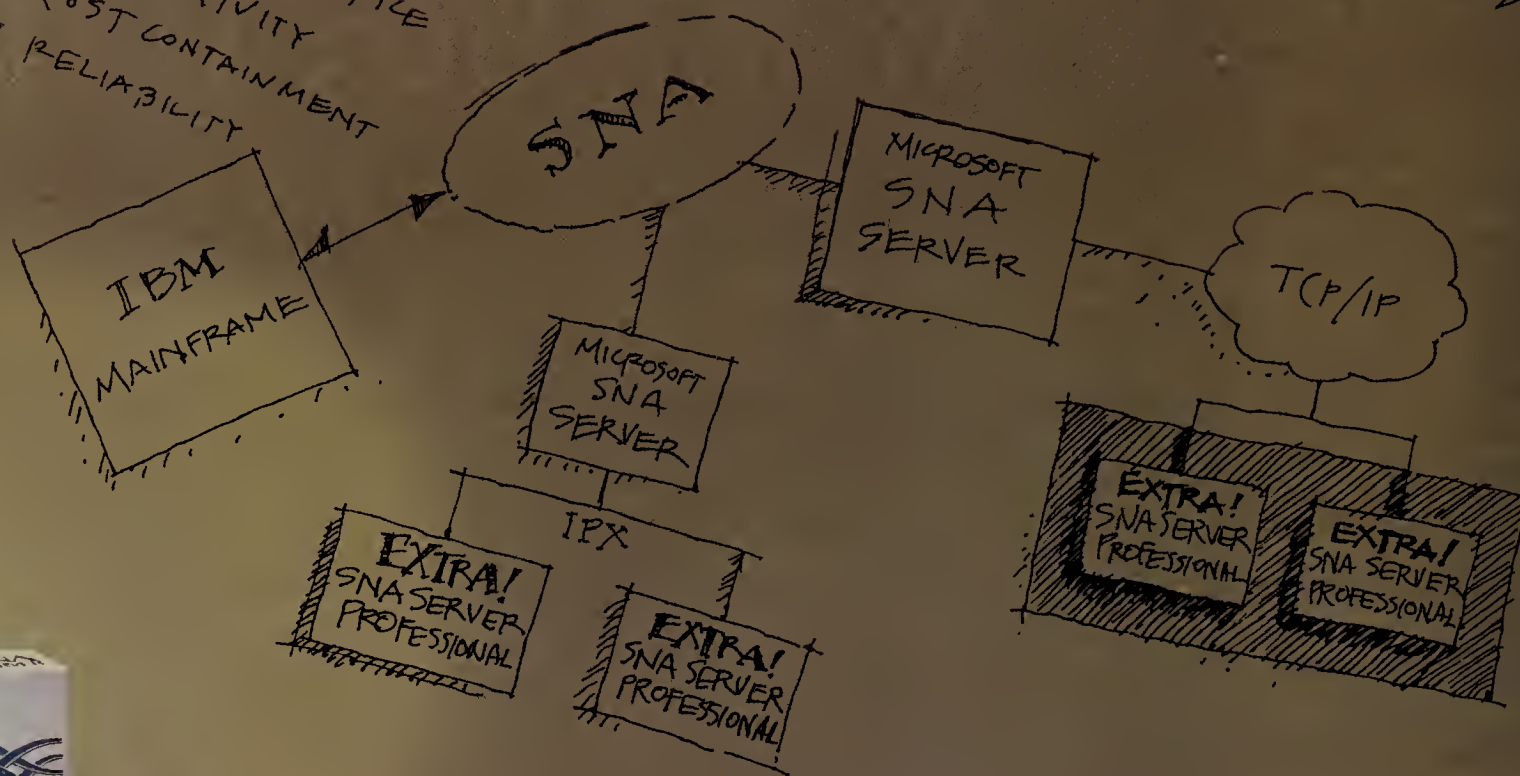
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Briefs

■ **Oracle Corp.** this week will announce *Express Objects*, a development tool for building **on-line analytical processing (OLAP)** applications. The tool will let developers reuse OLAP objects and extend applications with a Visual Basic-compliant scripting language. Available now, the Windows-based *Express Objects* costs \$3,995 per developer. Oracle: (415) 506-7000.

■ **VideoLan Technologies, Inc.** of Louisville, Ky., last week shipped VL2000, a **desktop videoconferencing system** for LANs and WANs that transmits television-quality video over twisted-pair telephone wires. It features a broadband switch that lets up to four sites connect for a videoconference. With a moderator, as many as 16 sites can participate in the conference.

Pricing is \$4,795 per seat for 64 seats, which includes the conferencing switch, a gateway that compresses video into the H.320 format, camera, microphone, speakers, video overlay card, transmission board and metallic fiber modem.

VideoLan: (502) 895-4858.

■ **Powersoft Corp.** of Concord, Mass., last week announced *S-Designer 5.0*, a version of its **client/server design tool** that supports Windows NT and Windows 95 and includes a new report engine. The software also has several new modules for application modeling and managing data dictionaries. *S-Designer* modules are priced from \$995 to \$2,495 each.

Powersoft: (508) 287-1500.

■ **SAP AG** later this month will unveil **Internet-related additions** to its R/3 business applications. SAP, of Walldorf, Germany, intends to allow users to deposit order-entry information directly into R/3 using Web browsers, according to company officials. SAP also plans to allow R/3 systems to exchange data over the Internet.

Web adding luster to DCE's services

Users attracted to combination of easy-to-use client and robust back-end network services.

By John Cox

Tarpon Springs, Fla.

The explosion of interest in the Internet and World-Wide Web seems to be adding new luster to the Distributed Computing Environment (DCE), a set of standard services for cross-platform, distributed applications.

As seen at the recent Decorum '96 conference, which focuses on DCE-based computing, attendees clearly view the Web as a fast and easy way to extend the DCE systems they are laboriously building to new user communities.

Several vendors, including Gradient Technologies, Inc., Sun Microsystems, Inc. and Transarc Corp., announced or demonstrated Web-related

products that can take advantage of DCE's security, directory and other services.

"DCE is needed by companies to create mission-critical Web applications," said Scott Kandel, senior manager at Deloitte & Touche LLP's distributed computing infrastructure group in Los Angeles.

DCE services can authenticate users accessing applications from the Web and coordinate the interaction of multiple server applications and databases to service a Web request, he said.

Deere & Co., a heavy equipment builder in Moline, Ill., plans to deploy in June an order-viewing application for its dealers that is based on Web and DCE

technology, according to Ron Hoyer, a senior analyst with Deere's IS group.

Dealers with PC-based Web browsers will be able to access a Deere Web server in Moline. Filling in HTML forms will generate a request that can be picked up by DCE security and directory services, and then funneled to the appropriate IMS databases.

The resulting data will be formatted into HTML and displayed in the browser. Deere will be able to grant secure, controlled access to its corporate data without having to build, deploy and maintain hundreds of PC client applications or change its host IMS system.

Another customer, Ohio State University Chief Technologist Tom Sanfilippo, told attendees that the economics of the Web combined with DCE can

See DCE, page 33



Edify to roll out interactive Web-based application

By Barb Cole

Santa Clara, Calif.

Edify Corp. will announce this week a client/server application to provide interactive customer support over the World-Wide Web. The application, called Page Call, lets Web users request a telephone link to customer service representatives by clicking a button on a Web page.

The software then automatically arranges for a telephone callback from a service representative. It also puts the same Web page being viewed by the customer onto the representative's computer screen.

In addition, the software allows the customer service representative to track and view the customer's movements on the Web site in one window, while tracking customer data or inventory status in another. Page Call is designed for customer self-service applications and employee self-service applications, such as those used in help desk and human resources departments, company officials said.

"A typical application might be where a user is browsing a Web-based catalog, but they have

a question about an item that's not answered on the Web site," said Roger Lee, vice president of Internet products at Edify.

The server-based application is part of Edify's Electronic Workforce suite of self-service applications. Page Call works with common Web browsers and standard Web servers but is designed to run on separate Windows NT or OS/2 servers. The application uses software agents that collect information from databases and send messages to telephone switches.

Analysts called Page Call

innovative.

"I don't think anybody else is integrating telephony with workgroup computing platforms and the Web," said Geoffrey Bock, an analyst at Patricia Seybold Group, a market research firm in Boston. There is a growing need for applications that help companies become more customer-centric, he said.

Page Call works with all standard private branch exchange and automatic call distributor protocols. Available now, it is priced starting at \$40,000.

©Edify: (408) 653-1350.

HOW PAGE CALL WORKS

1 A customer viewing a company's Web site activates a Call Me button.



Customer

Page Call Application Server

2 That signals the Page Call Application Server at the company site to set up a call to the customer from the next available customer service rep.

ACD or PBX

3 Page Shadow, another component of the application, gives the service rep a view of the same Web page being viewed by the customer.

GRAPHIC BY: D. BARKER

Pioneer FileNet takes to the enterprise



FileNet Corp. is a pioneer in the workflow and imaging software market. During

the past year, the company has acquired imaging software maker Watermark Software, Inc. and document management system provider Saros Corp., and has begun assembling a suite that combines their offerings with its own

workflow system. Senior Editor Barb Cole recently asked FileNet Chief Executive Officer and cofounder Ted Smith about the company's direction, including its plans to move beyond departmental boundaries.



FileNet's CEO and cofounder Ted Smith

What's driving the growing interest in workflow, imaging and document management systems?

For the first time, the network infrastructure is in place and expanding rapidly, both in terms of availability and bandwidth. PCs are also proliferating. So you don't have to make a new investment in hardware and networks to get these applications going.

What other factors will influence the adoption of the software you sell?

Companies really want to get better control of information so they may access it and eliminate it based on a retention schedule that they define. The other factor is the proliferation of high-bandwidth communications. Lots of multinational corporations still don't have cost-effective, high-bandwidth nets. Retail banks, for instance, often still can't afford high bandwidth out to the branch. As frame relay and ATM become more widely available, it will make deploying these applications easier.

See FileNet, page 33

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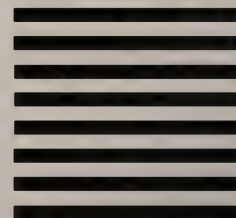


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FileNet

Continued on page 31

What did buy Saros?

We recognized that there are lots of documents — word processing files, spreadsheets, graphics — that are not in some regimented form and need to be managed.

This kind of information is scattered around nodes on the net, typically accessible by only the author or a workgroup. Document management has emerged to make that information available on an enterprise scale.

Haven't these workflow, imaging and document management applications traditionally been departmental in scope?

Yes, they've been departmental or division-oriented, which has left the general user out.

In the last few years, though, organizations have started to get interested in unlocking the assets they've accumulated in these stored documents.

What are your plans for the Internet?

We are Web-enabling all our software. Saros already has @mezzanine for managing information dispensed on the Web. We're also looking at introducing browser plug-ins to enable document imaging and workflow on Windows clients.

When you think that a lot of Web applications are publishing applications, the document management tools are right on target.

DCE

Continued from page 31

take much of the expense out of developing run-times, deploying applications across platforms and performing configuration management.

The university is deploying DCE as its distributed computing infrastructure, while the Internet and Web are used for accessing and viewing information.

One new project relies on using Netscape Communications Corp.'s Web server-based APIs to create a secure link between the Web browser and, on the Ohio State backbone, DCE services and Transarc's Encina transaction monitor.

The result is that Web browsers, which know nothing about transactions, can now work as the desktop users' graphical access point to host applications and data. ■

MORE ONLINE

Click over to Network World Fusion

(<http://www.nwfusion.com>) for links

to documents on the Open Software

Foundation's DCE-Web project. Select

News+ then Client/Server

Applications.



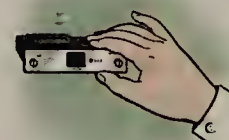
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BusinessBriefs

Compression Labs, Inc.'s (CLI) President and Chief Executive Officer **John Tyson** resigned late last month and the company's board of directors appointed **Gary Trimm** to take his place. Trimm joined CLI in February 1995 as senior vice president of the company and president of its broadcast products group. Prior to that, he was president of subscriber systems and the North American divisions of Scientific-Atlanta, Inc., where he had worked since 1988. CLI, a designer and manufacturer of digital video communications products, is based in San Jose, Calif.

The **University of Michigan** has signed an enterprisewide licensing agreement with **PeopleSoft, Inc.**, a Pleasanton, Calif., maker of client/server applications. The PeopleSoft applications will replace the university's existing financial, human resources and student information systems over a four-year period.

Sybase Financial Services, Inc., a subsidiary of Emeryville, Calif.-based **Sybase, Inc.**, last week said it will offer new financing programs that let value-added resellers (VAR) offer installment payment plans to their customers. Such financing plans are typical when buying software through direct sales channels. Sybase officials said the move is designed to support VARs, which Sybase expects will account for a growing percentage of its revenue over the next few years.

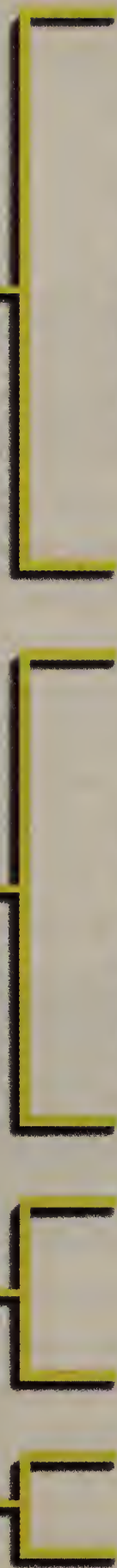
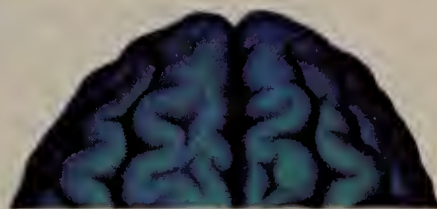


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SHARED LOGIC

Marc Myers



Sun's Java: It's not caffeine-free

Java is a programming language. Just thought I'd let you know that up front. If you've been inundated with hype about Java, you might think, as I did, that it is an easy-to-use, point-and-click scripting language for Internet client development.

It's certainly not. Java is really a sophis-

ticated programming language that only an individual experienced in object-oriented programming, networking and the World-Wide Web will be able to master.

At a recent tradeshow, I wandered over to Sun's booth to check out Java. The sales representative proceeded to show me a few dozen pages of Java source code. That

was supposed to be a demo, but it turned out to be my wake-up call to the fact that the people over at Sun are still living in a Unix world. They assume that people will be able to program this language based on their background in C programming.

Would all the expert C programmers please stand up?

But there's a bright side to Java. The most significant thing about it is how quickly the language has captured the mind share of Webmasters and Hyperpeople who put home pages together. It seems there is a real possibility that Java will become the standard for Internet and intranet client-side development.

By quickly converging on a standard for Web client-side development, the industry will have created, for the first time in my memory, a fully standardized solution reaching from the user interface all the way to the database. And that's very desirable.

Java, though difficult to master, is extremely well-engineered based on what I am hearing from developers and reading in Sun's white papers. And there will be a number of tools coming out to mask the underlying complexity of Java, including RogueWave's Jfactory and Borland's Latte. Also, Java is backed up by the technical and marketing muscle of Sun.

Imagine a fully standardized Web with Java-compliant applications running happily on Netscape-compliant browsers over TCP/IP.

In this scenario, the following expenses would be drastically reduced or entirely eliminated (at least with respect to Internet site development): tool selection, programmer training, architecture selection, coding, system integration and porting.

Yes, even coding would be drastically reduced, due to the fact Java is truly object-oriented. And porting is a nonissue because Java is already ported to all the important operating environments. All that's required to run a Java program on Windows, OS/2 or Motif is the Java interpreter and the appropriate run-time system files for your environment.

Java's not perfect. It could be easier to program, for example. But it's close enough that a push toward full standardization of Java as the development environment for HTML browser-based applications will benefit everyone in the industry, except Sun's competitors.

Just to keep things in perspective, however, let me close with a quote from my company's suggested methodology for Internet site development: "You may be surprised at how difficult pure Java code is to produce. In order to get an accurate estimate of how long the project will run, you may want to bring in object-oriented architects and consultants experienced in Java and C programming to give you a better feel for actual development time."

Myers is president of Client/Server Connection, Ltd., a Cambridge, Mass.-based firm specializing in client/server software solutions. He can be reached at (800) 622-1108, Ext. 522, or via CompuServe at 71332,1726.

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Electronic Commerce

Covering: Tools and Techniques for Interenterprise Networking
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Briefs

■ **Internet start-up BigBook, Inc.** has launched a **Web-based Yellow Pages** that lists 11 million U.S. businesses, and has street-level maps pinpointing their locations. By midyear, BigBook expects to include Canadian and Mexican businesses, with firms in Europe, Asia and South America to be added next year.

BigBook: www.bigbook.com.

■ **Process Software, Inc.** has begun shipping the **Purveyor WebServer** for NetWare, which supports TCP/IP over IPX encapsulation. In April, Process will begin beta-testing a native **IPX-based WebServer** for NetWare product.

Process Software: (800) 722-7770.

■ **McAfee** next month will ship **WebStor**, a \$65 client backup storage system that runs on either Windows 95 or Windows NT, for use on corporate intranets.

■ **Federal Express Corp.** has started accepting **parcel-shipment requests** at its Web site in a pilot program involving a limited number of corporate customers.

FedEx already lets customers check their shipment status at the Web site. But with fraud on the open Internet an issue, FedEx is taking a more cautious approach to Web shipping requests.

■ **Twenty-three organizations**, including the American Library Association, the Association of American Publishers, Apple Computer, Inc., CompuServe, Inc., Microsoft Corp. and Prodigy Services Co., have jointly filed a **lawsuit** to overturn the Communications Decency Act's ban against **indecent material** on on-line services or the Internet.

Rallying under the banner **Citizens Internet Empowerment Coalition**, the group said the new law is overly vague, threatening the rights of freedom of speech.

Netscape unveils server suite, targets rivals

By Peggy Watt
San Francisco

Netscape Communications Corp. is fighting freebies with freebies, and suites with suites.

The company that gained a dominant market slot by seeding the 'Net with free Navigator browsers isn't letting rival Microsoft Corp. grab the Web server market with the same tactic.

At its first developers' conference here last week, Netscape unveiled Netscape FastTrack Server, a starter Web server that will be available for free down-

support Sun Microsystems, Inc.'s Java and JavaScript.

FastTrack Server competes with Microsoft's Internet Information Server (IIS), which Microsoft offers free and bundles with the \$699 Windows NT. However, IIS runs only on Windows NT, and FastTrack — like Netscape's other Web servers — will ship for Windows NT and a variety of Unix platforms.

"I want that server," said Adam Elman, Webmaster with Highwire Press at Stanford University in Palo Alto, Calif. He said its easy setup and maintenance would help him manage hefty academic journals on-line. Stanford, like many universities, favors Netscape on Unix systems.

Netscape Enterprise Server is positioned as an industrial-strength intranet or Internet

server with built-in database connectivity. It comes bundled with development tools and is the cornerstone of SuiteSpot.

Other SuiteSpot components include:

■ **Netscape LiveWire Pro**, an integrated visual development environment with built-in database connectivity. It comes with a run-time version of Informix Software, Inc.'s Online relational database.

■ **Netscape Catalog Server**, a self-maintaining resource directory intended primarily for intranets. It builds a directory of people and documents, accessed using Verity, Inc.'s full-text and relational data search engine, which is licensed by Netscape.

■ **Netscape Proxy Server 2.0**, which provides replication and caches Internet documents inside the firewall. This version is updated with replication-on-command so users can write scripts to automate document retrieval, and it adds new filtering functions for net managers.

■ **Netscape Mail Server**, a cli-

Netscape's new lineup

- ▶ **FastTrack Server** (Competes with Microsoft's Internet Information Server)
- ▶ **Enterprise Server** (Absorbs Netscape's Commerce Server and Communications Server; also includes Navigator Gold and LiveWire)
- ▶ **Catalog Server 1.0**
- ▶ **Proxy Server 2.0** (Update to existing product)
- ▶ **News Server 1.1** (Update; 2.0 version due this year)
- ▶ **Mail Server 1.1** (Update; 2.0 version due this year)

Plus:

LiveWire Pro
(Development environment)

ent/server messaging system, and Netscape News Server. Both are updated to Version 1.1 with the SuiteSpot's release, but Version 2.0 is due by year-end.

The six-component SuiteSpot is priced at \$3,995 for either Unix or Windows NT. Individual server components cost \$995 each; Netscape LiveWire Pro costs \$695.

©Netscape: (415) 528-2555.



load. It also launched a suite of server applications that target Microsoft Corp.'s BackOffice and Lotus Development Corp.'s Notes, at least as they relate to both the Internet and intranets.

Netscape's SuiteSpot server is built around its new Enterprise Server 2.0, which combines the Communications Server and Commerce Server and bundled development tools. Other SuiteSpot components are the new Catalog Server and LiveWire Pro development environment, along with updates to Netscape's existing Proxy Server, News Server and Mail Server.

"The suite is designed to bring Internet technology even further inside the firewall," said Marc Andreessen, Netscape's chief technology officer. He emphasized the suite's support for open Internet standards, including HyperText Transfer Protocol (HTTP), HTML, Simple Mail Transfer Protocol and Netscape's Secure Sockets Layer (SSL) 3.0.

SSL 3.0 adds client-side certificate authentication, although it will not be supported on the client side until the next update of Navigator. All components also

Libraries buy books using EDI over the Web

Start-up is first to offer software allowing big savings on libraries' book purchases.

By Ellen Messmer

A dozen university and corporate libraries have started to use EDI over the Internet to buy books.

Yale University, Westinghouse Electric Corp. and Massachusetts General Hospital are among the organizations that now get steep discounts from roughly 5,700 publishers. They get the break by transmitting book orders in ANSI X12 Electronic Data Interchange 820 format to a Web site managed by Bank One Services Corp. in Columbus, Ohio, which acts as a clearinghouse for order and payment processing.

The Internet book-buying effort was organized by RoweCom, Inc., a Belmont, Mass.-based start-up of library professionals, which wrote the software used by all involved parties: buyer, seller and bank.

"The traditional book agent charges list price plus service charges, typically in the 3% to 4% range," said Dick Rowe, president and founder of RoweCom. By ordering over the Internet

using EDI, libraries get a 5% discount, but pay RoweCom a \$5 charge per order.

"We are saving money," said Bernie Hurley, director of access services at University of California at Berkeley. "I'd like to see all our materials ordered through the Internet and paid for electronically."

So how's it work?

When a library sends in an EDI 820 payment order to the Bank One Web server, Bank One strips off the payment information it holds, converting it into the financial industry's Automated Clearinghouse (ACH) format. It is then sent out on the ACH network to instruct the buyer's bank what to pay the seller's bank.

The Bank One server then sends the 820 order information to the publisher, and acts as the middle point for distributing EDI invoices, order acknowl-

edgements, shipment notices and status reports.

While about 20 banks are EDI-capable, only Bank One met the Internet requirements and was

ready to go by last October — an important book-buying time for libraries, Rowe said.

"So far, things have worked well, and we've had orders come through and money appear in our accounts," said Terry Basom, chief financial officer at Oryx Press, Inc., a Phoenix-based publisher.

RoweCom has also forged alliances with the makers of library automation software, such as Innovative Interfaces, Inc., to integrate library cataloging and ordering into RoweCom EDI software.

Plans are now under way to deliver some publications in electronic form, too, to libraries ready to store them digitally. ■



RoweCom's president and founder Dick Rowe.

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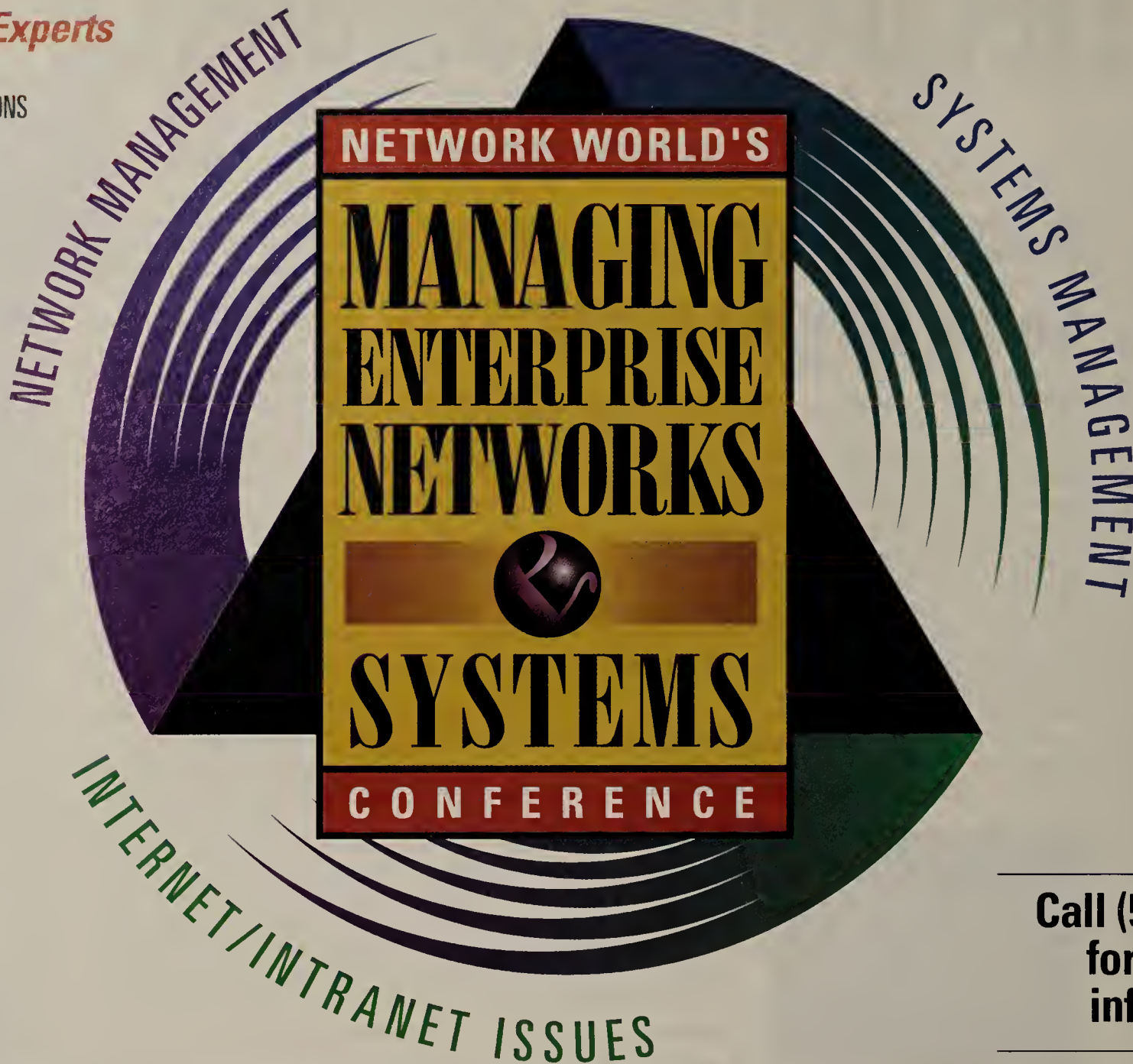
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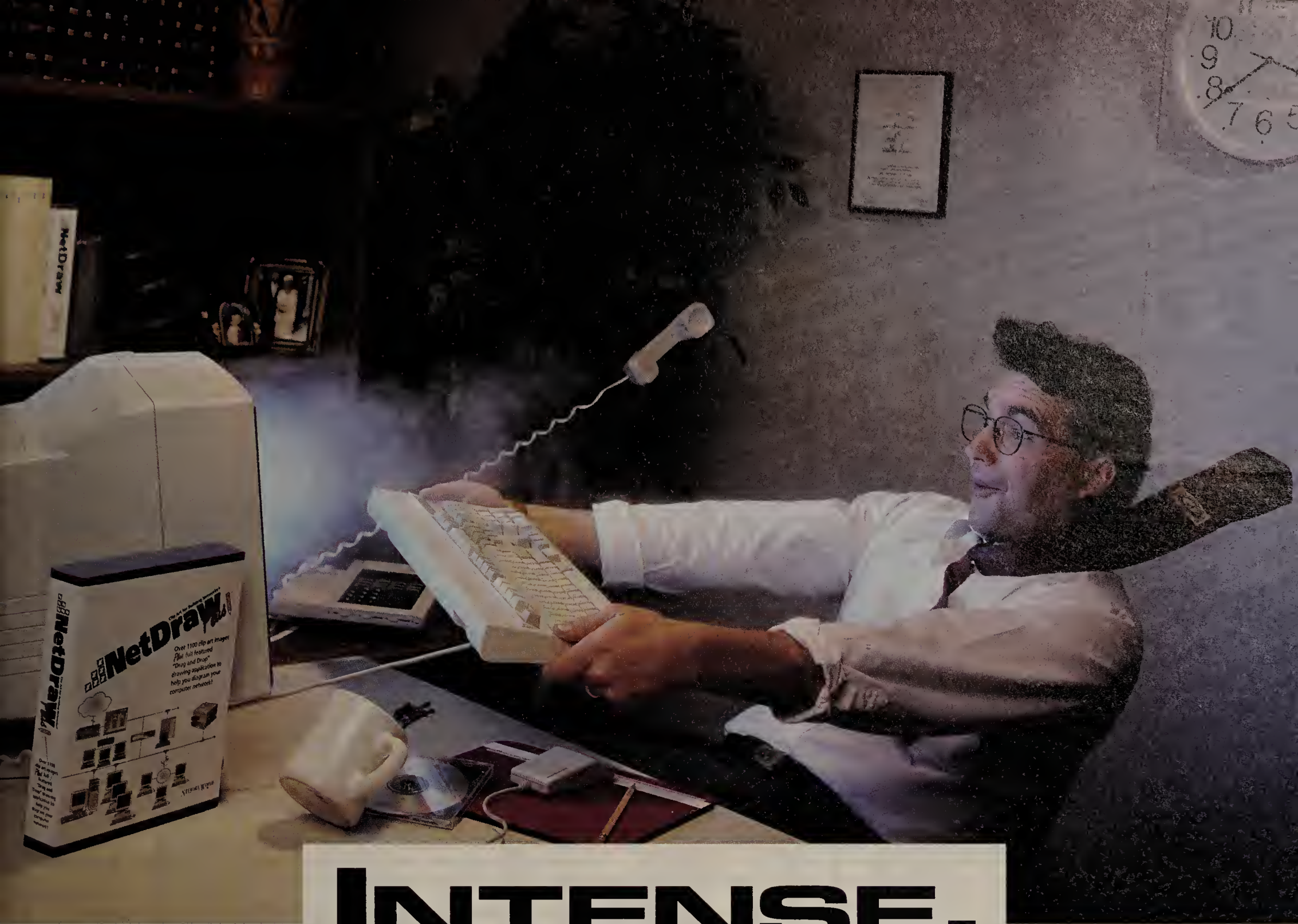
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According to International Data Corporation (IDC), Intranets are growing faster than the Internet itself. The number of Intranet Web servers now comprise 55% of total internet servers and are expected to nearly triple in size this year to more than 200,000 and to exceed 4.5 million by the year 2000.

While Intranet Web servers today act mainly as document publishing systems, a number of vendors are now rapidly extending their functionality. For example, Web servers are being integrated with databases, linked to mainframes and other legacy systems, and providing workflow services. Combined with the high bandwidth capacity of corporate data networks, your organization can capitalize on advanced features such as real-time audio and video as well as collaborative applications and 3-D data representation.

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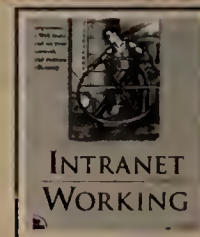
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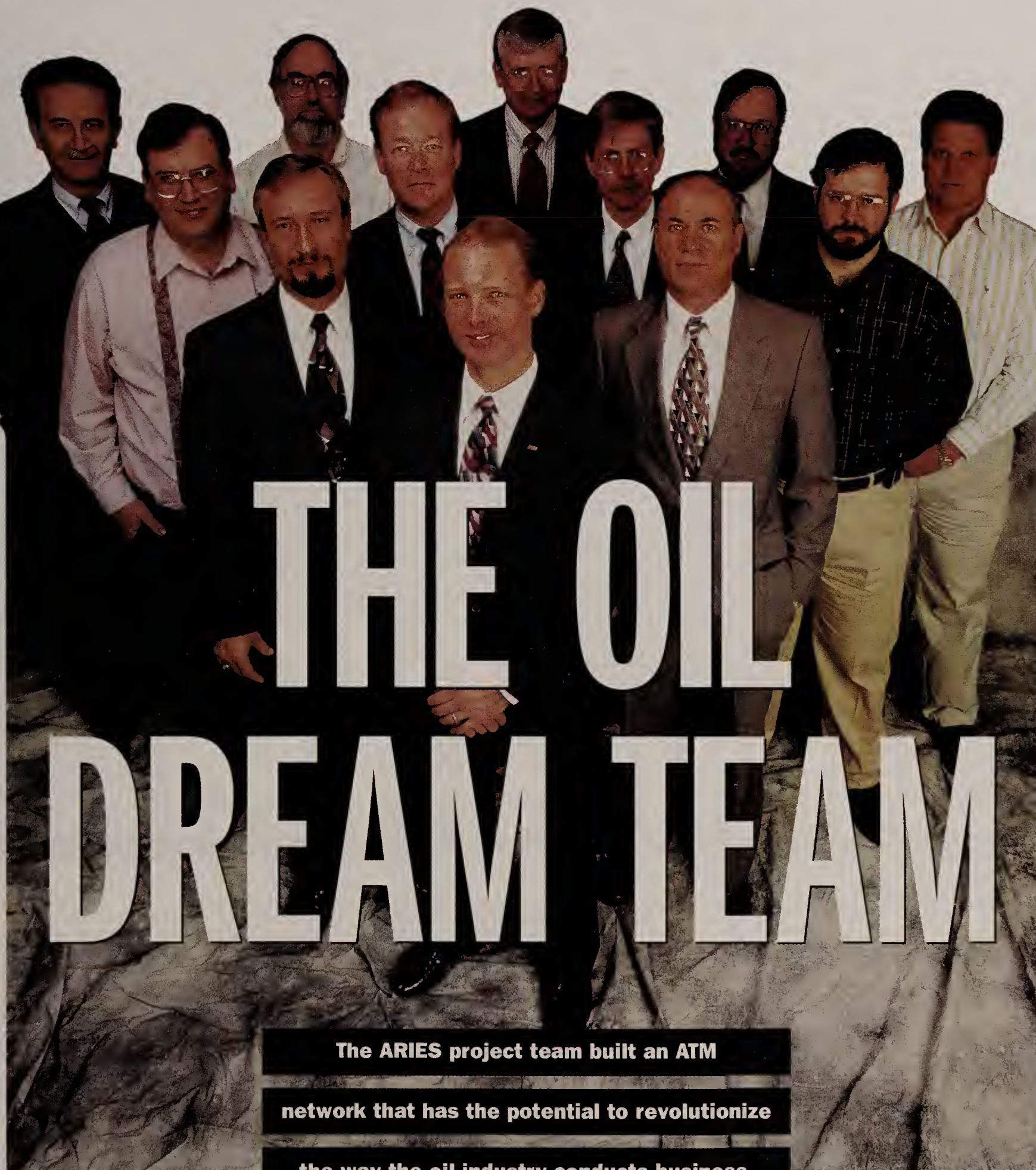
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The ARIES project team built an ATM

network that has the potential to revolutionize

the way the oil industry conducts business.



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Team computing at its most powerful

One cold, windy day in Washington last month, the ARIES project team convened to hammer out the final details of an ATM network it is building.

In an unprecedented cooperative effort, all of the major oil companies and their partners have marshaled their scientific and networking expertise for this project.

Though you would never know it from the sense of calm and confidence at the meeting, the ATM network could revolutionize the way the companies explore for oil in new frontiers, like the deep waters of the Gulf of Mexico.

As discussed in our cover story, geophysicists will be able to immediately share and jointly analyze seismic images with associates thousands of miles away.

The team's vision is to use this network to provide a "virtual joystick" that would let these landlocked researchers actually direct oil explorations as they are happening. Today's method seems laughable in comparison. The data is stored on magnetic tape and shipped – often months later – to a supercomputer center for analysis. By that time, the on-site researchers have long moved from the target area.

This network will help skim many months off the time and money needed for remote oil exploration. So next time you're pumping gas and grouching about the cost, think about the ARIES team and hope that its ATM efforts are successful.

—Beth Schultz

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By Gary Rowe and Daniel Blum

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Tools for teams: Multimedia chat room

By John Dix

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By Beth Schultz

In a unique partnering between the oil and communications industries, the ARIES project team pulled together an ATM network that lets companies collaborate on remote oil exploration.



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The dating game: Synchronizing calendars across the wide area

By Joel Snyder

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At the edge of the Web

The World Wide Web Consortium at MIT recently sponsored a workshop about how the Web can support collaborative efforts. Collaboration caught up with the leader of the workshop, Lotus' Irene Greif, to see what transpired.

DEPARTMENTS

4 Sum of the parts

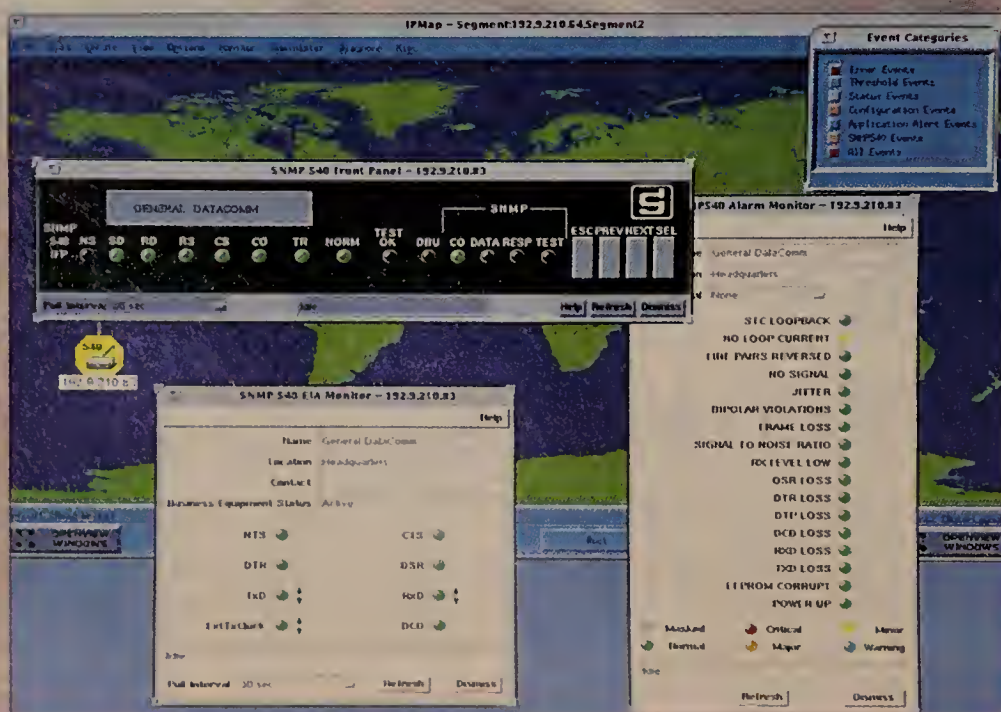
Conferencing product vendors to stage interoperability demonstration; AT&T to sponsor a special National Information Infrastructure (NII) Award for telecollaboration; Videophones someday may be the answer for team members on the run; A whopping 52% of organizations have employees that work part time from home.

30 Collaboratus

Why doesn't Microsoft understand groupware? By Jeff Held

The company has been marching toward dominance in almost every area of software, with one notable exception: groupware. Why is that?

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SUM OF THE PARTS

*Tips and tidbits about
collaboration products,
issues and trends*

Conference vendors to demo T.120

Vendors of standards-compliant conferencing products will put their money where their mouth is later this month at an interoperability demonstration being conducted under the auspices of the International Multimedia Teleconferencing Consortium, Inc. (IMTC).

Approximately 30 companies will participate in the demonstration, dubbed Event 120. The demo will show interoperability based on the ITU T.120 standards, says Joe Sullivan, a member of the IMTC and director of multimedia services for ConferTech International, Inc.

The T.120 series consists of application-level and infrastructure protocols. Adoption of the ITU's T.120 audiographic and H.320 videotelephony suites give multimedia teleconferencing equipment manufacturers, developers and services providers a basic connectivity protocol on which they can build products, applications and services, explains the IMTC, which is a nonprofit corporation that promotes international standards for multipoint audio and videoconferencing.

The demo, which will take place in Santa Clara, Calif., is being sponsored by Intel Corp. and Microsoft Corp. "We know this is fairly early in the development cycle for products based on the standard, but we want companies to get together early to work out interoperability issues," says Al Korenjak, engineering alliances manager at Intel.

Korenjak says most vendors do not expect to ship T.120-based products until late this year or early 1997.

Collaboration can be rewarding

National Information Infrastructure (NII) awards program expands with telecollaboration category.

If you've got an interesting collaborative application, organizers of the National Information Infrastructure (NII) Awards program want to hear about it.

The program recognizes the best applications on the NII, which essentially combines public and private networks and the Internet. Winners of NII Awards will be recognized at a ceremony this fall and will be highlighted in a national media and education campaign.

This year, AT&T is sponsoring a

special award for telecollaboration, says Mary Spada, category chair and principal at Global Growth Strategies, a consultancy in Silver Springs, Md.

The AT&T NII Telecollaboration Award will be given for the best example of real-time network collaboration. Entries must show uses of the information infrastructure that im-



prove collaboration across organizations. The application should promote partnering and include such operations as distributed imaging as well as document and information sharing.

"This will bring together a really cool group of applications, like virtual teaming," says Spada.

Companies and organizations must submit their entries by May 1. Information about the program is available on the World-Wide Web at <http://www.gii-awards.com> or by calling (800) 250-2838.

Hey! Is anyone out there?

If you feel like it's getting harder and harder to round up team members for spur of the moment meetings, you're right. A whopping 52% of the organizations surveyed recently by International Data Corp. say they have employees that work at least part of the time from home.

Although many companies still do not condone the practice, the entire work forces of some companies work out of their homes. On average, 12% of the respon-

dents work force telecommute.

"The amount of time that telecommuters spend at home is also expected to rise," IDC says in its report, Mobile Messaging Usage and Preferences — a Demand-side Outlook. While most of the employees that do work at home are only there one day a week, more than a fifth of the respondents already work from home two or three days per week. These numbers will grow over the next 12 months.

PERCENTAGE OF WORK FORCE WORKING AT HOME

% of work force	Today % of repondents	In 12 months % of repondents
0	48	41
1-4	21	16
5-9	9	12
10-19	7	11
20-49	5	9
50-74	5	7
75-99	1	1
100	6	6

AVERAGE DAYS PER WEEK TELECOMMUTERS WORK AT HOME

Days	Today % of repondents	In 12 months % of repondents
1	29	31
2	8	10
3 or more	14	18
None	50	42

Source: International Data Corp., Framingham, MA.

Handy-dandy video phone

When the phone won't do for collaborating with team members on the run, the answer may be the videophone.

Under development by Matsushita Electric Industrial Co. (the parent of Panasonic), the videophone is designed for use with Japan's Personal Handyphone System (PHS), the country's cordless phone system. Although PHS is limited to speech today, extensions for data and multimedia service are in the works.

These extensions have to take into account that PHS channels are only 32K bit/sec. The prototype videophone makes do by using H.261 compression to squeeze video signals down to size and a host of other technologies to overcome the inherent transmission errors common to wireless links.

The result is a 19.6-ounce device with a 2.5-inch color LCD display and a 1/3-inch CCD camera that supports transmission of three to seven frames per second. Functions include picture-in-picture, still mode/holding mode and high resolution mode (352x288).

Future versions could start showing up domestically down the road.



The Great Replication Debate

By Gary J. Rowe and Daniel J. Blum

Replication, Lotus Development Corp. will tell you, separates the men from the boys in the vibrant messaging/groupware market.

But is the company to be believed? Or is replication simply a red herring, a function Lotus is trying to position as a key differentiator as it watches with growing unease the advance of Microsoft with Exchange, Novell with GroupWise XTD and Netscape with its newly acquired CollabraShare offering?

Well, it isn't a fish story, but then again, the replication schemes the other companies are hawking aren't without merit. Notes offers decided advantages, especially as a tried-and-true technology, but the market will probably come to depend on various approaches for different needs.

Replication is critical for messaging and groupware because it enables these systems to consistently represent information to a distributed group of users or applications.

In evaluating how Notes Release 4, Exchange, CollabraShare and GroupWise XTD support (or will support) replication, it is of value to first consider the basic flavors of replication: server-to-server and client-to-server.

The server-to-server category is the core mechanism for ensuring consistent information across your enterprise. Client-to-server replication is also known as in-box replication or local replication.

Particularly valuable to traveling users, in-box replication allows users to synchronize local object stores on their computer with those on a home server. They can then browse a stuffed mailbox, an interesting corporate discussion database or choice bits of the World Wide Web even while flying in an airplane.

RPC vs. messaging replication

Information can be replicated from server to server using one of two approaches: remote procedure calls (RPC) or messaging. Lotus uses an RPC-based model exclusively, while Novell is banking on messaging-based replication. Microsoft and Netscape employ hybrid models that leverage both message- and RPC-based replication.

The RPC model of server replication involves establishing a point-to-point connection between the replicator (server initiating the replication) and the target system. Documents are then updated and an ongoing dialogue ensures the suc-

Is Lotus Notes' replication strength reason enough to shun emerging tools from Microsoft, Novell and Netscape?

cess of the operation. This type of replication is generally conducted on a scheduled basis.

The messaging-based model takes advantage of the vendor's messaging systems. Basically E-mail messages are sent to each target server to be replicated. Replication can be either scheduled or sent as needed to all target replicas to be updated.

Before considering the individual vendor approaches, a few high-level observations about how the two approaches stack up (also see graphic, page 8):

- RPC replication relies on synchronous connections, which means there is some assurance that the replication was properly completed prior to closing the session. Messaging replication does not provide this immediate feedback since it is based on store-and-forward technology.

- RPC replication, given its real-time nature, requires an extensive infrastructure, while messaging-based replication can be built upon existing messaging foundations.

Now let's consider how some of the key messaging/groupware vendors are approaching replication.

Lotus Notes

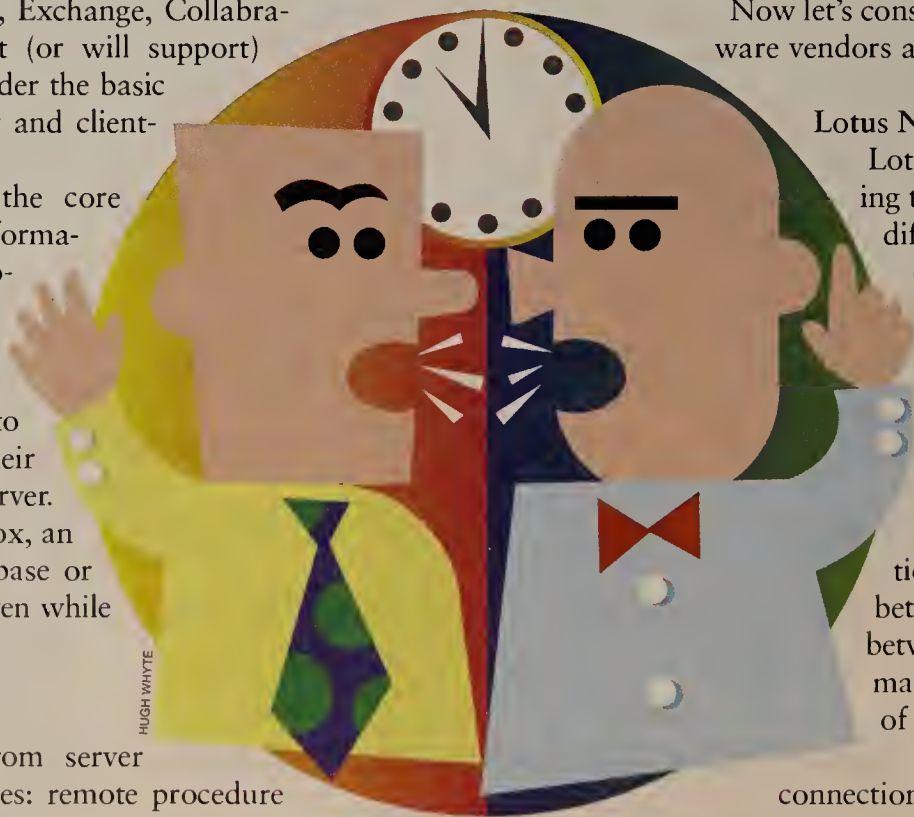
Lotus, the leading force in groupware, is pointing to replication as one of the key features that differentiates Notes from the newcomers, all of which are just now gaining replication in some form or another.

Ken Biscanti, Notes marketing manager, characterizes replication as "the core technology supporting Lotus Notes," and claims that "other vendors are trying to trivialize replication as a check-off item."

Notes is built upon RPC-based replication. This means that a direct link is set up between two servers, a dialogue is established between the machines, and immediate confirmation is available as to the success or failure of the replication.

Replication is based on a point-to-point connection, although it could pass through an intermediate server. Once the connection is set up, the update process can occur in both directions. Note that only the changes are propagated during the replication process.

Lotus, unlike Microsoft, uses the same replication model for all types of replication, including local replication, server-to-server replication and directory updates. Microsoft has one model for replicating public folders and another for synchronizing directories.





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All Notes replication is on a scheduled basis, although Notes users have tremendous flexibility in setting up these schedules. For example, replication can be set by priority, replicating only top-level documents or perhaps only documents from a certain author.

Lotus has enhanced its replication feature set with the Notes Release 4

offering. Key improvements include the addition of field-level replication and support for multiple simultaneous replication sessions.

Field-level replication means that if a remote user only changes one field in a large record, the system will replicate only that field as opposed to the entire record. Depending on the document,

field-level replication can deliver megabyte savings.

Field-level replication, along with Lotus' capability of conducting multiple simultaneous replication sessions, should improve the efficiency of the overall server-to-server replication infrastructure within a company.

Michael Mandelbaum, a vice presi-

dent at Chase Manhattan Bank, is one user looking forward to the enhancement. With a base of 18,000 Lotus Notes users in 40 countries, Mandelbaum says Notes replication has generally met his requirements but can be difficult "to get your arms around in a large environment."

Moreover, any irregularity in a replication cycle has a domino effect on subsequent activities, he says. This could be equated to the effect a car accident has on traffic in a city during rush hour.

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Some important replication questions to ask your vendor

- Can users access an object store on a remote server (e.g., not their home server), or is replication an absolute necessity?
- Are attachments (documents or forms) replicated as well as text?
- Is the replication two-way (synchronizing both sides) and can it warn of conflict?
- Does replication occur at the object store record level, or at the field level?
- Is data transferred by way of messages or some other protocol?
- Is replication at the field level, item level or entire object store level?
- How will replication be administered? Who decides what/when to replicate?

Chase has Release 4 in testing and Mandelbaum is "looking forward to the Release 4 improvements, particularly field-level replication."

Microsoft Exchange

Microsoft will support both RPC and messaging-based replication. RPC replication is supported within a site, which is Microsoft's terminology for an island of high-bandwidth synchronous LAN connectivity. Replication between sites is based on messaging.

Bill Kilcullen, Microsoft's Technical Product Manager on the Exchange Team explains that Microsoft selected this hybrid approach since "you can't always assume that you have the bandwidth for RPC." He emphasized that Exchange's data replication was

What's next? In networking, more and more companies are considering migrating from shared-media networks to high-performance ATM networks. The question is: Who really has the experience to help you decide if a move to the next generation of networking is right for you? Who has the best combination to get you out of the gate fast?

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handled separately from directory synchronization.

RPC replication is handled (per Microsoft) in a "near real-time" fashion. A busy server may temporarily refuse replication requests, however, if the target server isn't available. The request is registered in the directory for subsequent follow-up.

Thus, where Lotus allows the administrator to tweak replication schedules, Microsoft's servers attempt to optimize RPC replication automatically. Unfortunately, until users have more production experience with Notes 4 and Exchange, it will remain unclear which approach is best.

Message-based replication between

sites is handled by designating a server as the portal between its site and another site. This server is called a bridge-head server. Replication is handled on a scheduled basis and can use any messaging protocol supported on both connected bridge-head servers. This can include X.400 and the public Internet. Microsoft does allow admin-

istrators to tweak replication schedules for message-based replication.

Other approaches

Novell's GroupWise XTD and Netscape's Collabra Share product also support replication. Collabra Share is a current offering, and GroupWise XTD will be available by mid-1996 with a beta starting this month. Both products are primarily based on messaging replication, although Netscape recently added RPC-based replication to its offering.

GroupWise XTD will differ from Microsoft Exchange in that replication isn't scheduled - items are simply replicated across the messaging backbone as needed.

Eldon Greenwood, Novell's director of product management, says "messaging traffic has a lower priority than information to be replicated."

With CollabraShare 2.1, Netscape offers a replication agent that supports both direct and E-mail based replication. This Replication Agent allows direct replication where a high-speed network is available, and E-mail based replication where LAN connectivity does not exist, over the Internet or where the LAN speed is low.

Netscape's replication functionality can be centralized, if desired, through the use of an agent manager at the central site, or replication agents can be distributed to remote sites.

The Replication Agents support Baranof Software's MailCheck software, responding to mail monitoring "polls" sent out by the MailCheck program. This allows E-mail administrators to monitor the status of Replication Agents from a central graphical interface and to be quickly alerted about any problems.

Replication is, of course, only one of many elements to evaluate when considering a next-generation messaging-groupware platform. It does, however, have a major impact on the quality of data to which users have access.

Lotus is the overall winner in the replication debate. It has, over the years, continued to enhance its replicator. There is no substituting the value of a mature offering that has been gradually enhanced in response to real-world use.

Microsoft, Netscape and Novell also have solid approaches but are rolling out first-generation offerings. However, the use of a hybrid model incorporating the best of E-mail and RPC replication has promise. ■

Rowe (gjrowe@attmail.com) and Blum (dblum@interramp.com) are principals with Rapport Communication, a consultancy specializing in messaging and electronic commerce.

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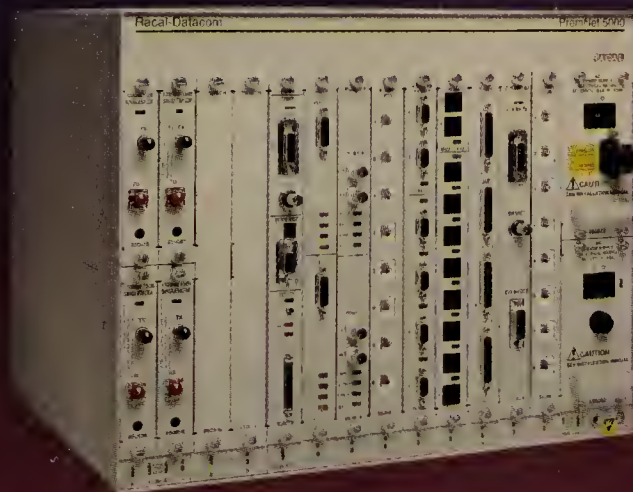


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Multimedia chat rooms

ForeFront's new tool brings visual aids to on-line sessions.

By JOHN DIX

TOOLS FOR TEAMS

Need to bring a geographically dispersed team together to refine a design? Try dialing up a teleconference and have the remote folks log into your multimedia chat room via the Web. Participants will be able to view images, exchange files, engage in text chat sessions and interact verbally over the phone.

That's how The ForeFront Group, Inc. envisions customers using the Web and its new Roundtable software, a component of the company's Net Suite line of products.

"When people talk about interactivity on the Web, they are primarily talking about information interactivity; one person dealing with a repository of data," says David Sikora, president of ForeFront. "We're proposing to extend that to allow human interactivity."

This is accomplished using ForeFront's Roundtable client software for Windows 95 and Macintosh desktops, and the company's Conference Server software for Windows 95, Windows NT or Unix. Conference server runs alongside a Web server.

Conferences will typically come together something like this: A team leader will notify participants of a meeting time. At the appointed hour, users will browse the conference Web page which lists live sessions, each represented by a hyperlink. This list is dynamic. As new meetings are created, the Web page is updated accordingly.

Clicking on a session gets the attention of the

server, which sends a message back to the browser telling it to load Roundtable, basically as a helper application, Sikora says. The server then establishes the connection and drops the user into the meeting. Roundtable becomes the GUI.

What you get when you enter a meeting is a blank electronic canvas, a roster identifying the other meeting participants and a text chat area. Users can exchange images, documents, messages and other types of files – such as sound clips – all in real time.

"I can take a document from my desktop and drag and drop it

onto my workspace, and you can see it or pull it off and store it," Sikora says.

Roundtable does not, however, let multiple parties manipulate the file, a function Sikora calls application sharing. If participants want to change something being reviewed, they have to download it and work on it using a local application.

True application sharing capabilities are planned for a future release, as is real-time audio support, which would do away with the need for a separate teleconference.

Real-time audio is a feature that appeals to Nancy Butler Songer, director of Kids As Global Scientists, a National Science Foundation (NSF)-funded research project at the University of Colorado School of Education.

But even without audio, Roundtable has a lot to offer.

"We develop educational curricula and learning opportunities for kids and teachers and were looking for a software tool that would allow large, geographically dispersed groups to share multimedia documents," Songer says.

"We haven't seen a tool [other than Roundtable] that could combine that with a chat session. Being able to click on a button and bring a document into a room for discussion is really interesting because there are a lot of education products that are images as opposed to just text."

Although Songer's group has limited experience testing Roundtable internally, she is enthusiastic about the technology because it will enable students to use the Internet to chat about shared images.

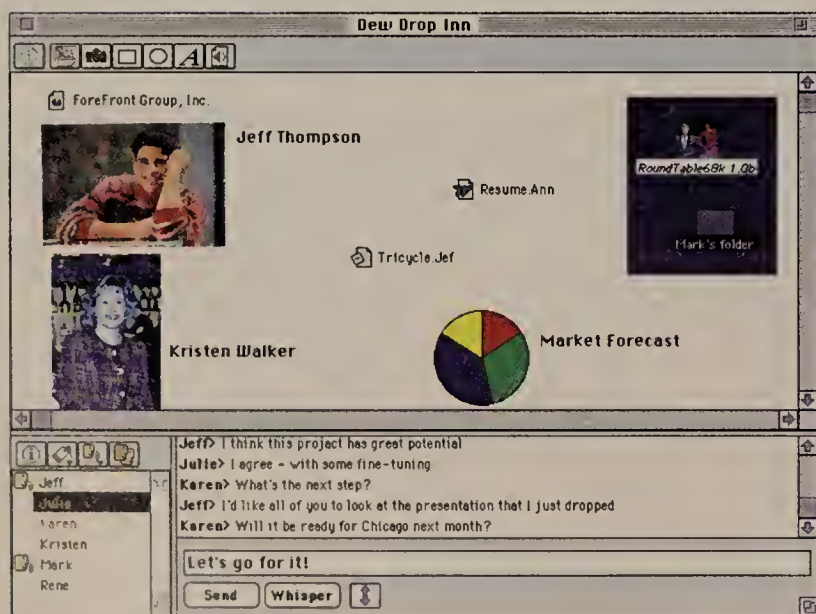
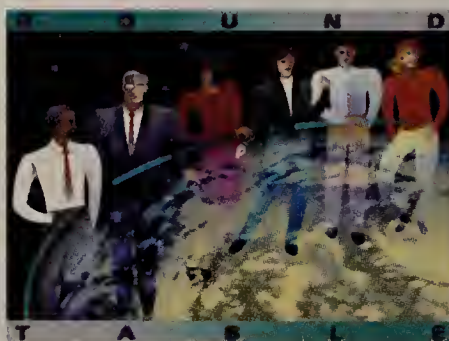
One potential application for Roundtable: teaching kids about weather in a science program. A colleague at the University of Michigan has an NSF research project called The Weather Underground, which has developed Blue Skies visualization software for viewing real-time weather images over relatively low-speed WAN links.

With Roundtable, the students could use the Internet to share the weather images and then discuss what they are seeing.

"If you tell kids we're going to study weather, big deal," Songer says. "But if you say we're going to talk to kids all over the world about weather, that's really neat. It's much more powerful."

Adults aren't supposed to require that kind of motivation. But let's face it, some team members nod off during conference calls. Tools that bring visual aids into the equation should keep things percolating and may spark some new ideas.

Sikora says the Roundtable client software will be distributed free, and Conference Server will probably range in price from \$500 to \$5,000, depending on the number of simultaneous users supported. The product is just leaving beta test. ■



ForeFront's user interface: includes an electronic canvas for multimedia objects, a roster of participants and a text chat area.



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OIL TEAM HITS GUSHER

The ARIES team pulled together an ATM net that lets companies collaborate on oil exploration.



Technical Director Dave Beering: *The ARIES team is pushing technical and political limits.*

Letting their imaginations run wild, members of the ATM Research & Industrial Enterprise Study (ARIES) team dreamed of big ships, far-off satellites and new-fangled network equipment.

The team envisioned building a network that would let an at-sea vessel immediately ship seismic data gathered from scans of the ocean floor's subsurface to a supercomputer thousands of miles away. They pondered how disparate companies could use this network to collaborate on oil gathering and how the industry would change because of it.

Unlike many fanciful imaginings, however, the ARIES dream became reality. Last month, the team installed an Asynchronous Transfer Mode switch, a satellite antenna and other equipment on board a seismic acquisition vessel exploring for oil in the deep waters of the Gulf of Mexico. It then allowed shipboard researchers to send the seismic data to landlocked colleagues for processing.

Installation of the shipboard gear was just the last step in a long series of events leading up to the demonstration. The ARIES team has built an ATM network that spans the country via satellite and terrestrial links (see sidebar, page 16).

"We took something that 18 months ago was literally on a bar napkin and built a prototype configuration involving more than a billion

dollars worth of hardware that has the potential to revolutionize the way the oil industry does exploration," says Dave Beering, technical director for the ARIES project and senior staff telecommunications analyst at Amoco Corp.

Beering, who has been involved with the ARIES project since its inception at Amoco, is still awed by what the team has been able to do and the latitude granted it by industry executives.

"The attitude that pervades the project is: 'I can't believe they're letting us get away with this!'" Beering exclaims. "We're pushing inter- and intracompany models by hooking up different oil companies on the same telecommunications network. There's no precedent for this. It's not only new and different, but it also had been taboo."

Discovery process

The ARIES project dates back to 1993, when network managers and planners at Amoco began assessing the future of company's T-1 backbone. The team determined the company needed ATM, but too many unknowns surrounded the technology so they wanted to closely examine it. That fall, Amoco executives blessed the idea of an ATM research project and Beering and his peers began building a cross-country ATM network.


But the ARIES team had only been given money to buy test equip-

By Beth Schultz



The oil dream team: (front) Dave Beering, Amoco.
(Row 1, L-R) Mike Zernic, NASA; Sleiman Elhatem, Chevron.
(Row 2) Bill Berry, Amoco; David Sims, Schlumberger;
Tim Salo, Minnesota Supercomputer Center; Joe Brewer, Amoco.
(Row 3) Victor Stepanians, Chevron; Larry Flourney, Texas Medical
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*In-Stat, Worldwide Enterprise Remote Access Market Share, 1994

*Dell'Oro Group, Worldwide Remote Node Server Market Share, First Half 1995

*IDC, Worldwide Combined Hardware and Software-Based Remote Access Server Market Share, First Half 1995

Networking for oil

The ARIES team, following 18 months of work, has realized its lofty ambition of building a high-speed network that will let multiple enterprises collaborate on deep-water oil exploration.

This network comprises two critical components, says Dave Beering, technical director for the ARIES project.

"One is the satellite-based piece, which links vessels to the super-computer center. The second is the shared terrestrial network that allows computation, visualization and collaboration across any geography," Beering explains. "The idea is that, based on ATM carrier services, people at different companies can collaborate on these data sets."

The ARIES team has established regional ATM centers in Houston with Teleport Communications Group and in San Francisco with Pacific Bell. The long-distance network, which operates at the T-3 speed of 45M bit/sec, is provided by AT&T and Sprint, Beering says.

Under this scheme, organizations within a region can connect to the center through a local access circuit and converse without traversing a long-distance connection. Both long-distance carriers are connected to the centers, so user companies have their choice of service provider.

The ARIES team plans on building additional centers in Chicago and Washington, D.C., and providing connectivity for sites in Dallas, Los Angeles and New Orleans.

—Beth Schultz

ment and access circuits, not ATM services and switches. "The idea was that we work in an experimental environment with the carrier networks and equipment providers," Beering says.

In other words, the Amoco team needed to partner with carriers and vendors that would donate services and equipment, respectively. "This wasn't anything that looked like an RFP. We recognized that the technology wasn't ready for prime time and that ARIES was going to make it possible to move the technology forward for us as a company and for the [communications] industry," Beering explains.

Amoco built the ARIES network in partnership with 17 companies, including AT&T, Ameritech, Cisco

Systems, Inc., Fore Systems, Inc., General Datacomm, Inc., MFS Communications Company, Inc., Newbridge Networks, Sprint, Teleport Communications Group and WilTel, which is now LDDS WorldCom.

Amoco's ARIES project, which was only funded for one year, culminated in December 1994 with a network

demonstration on Capitol Hill.

The next step

Intrigued by Amoco's work, the American Petroleum Institute (API), picked up responsibility for the project in 1995. "Many of our members are looking at ATM as an information and infrastructure technology. Plus, a lot of money is expended worldwide on seis-

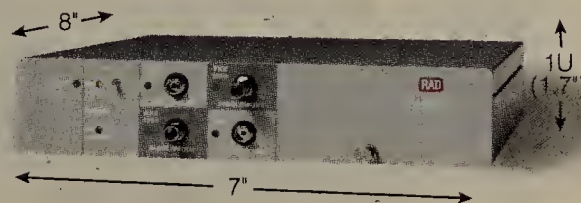
mic data collection," says Ray Cline, director of information systems for the API and an ARIES team member.

ARIES metamorphosed overnight from an Amoco-only undertaking to an oil industry venture. API is a Washington, D.C.-based consortium of about 320 North American companies involved with oil, petrochemicals,

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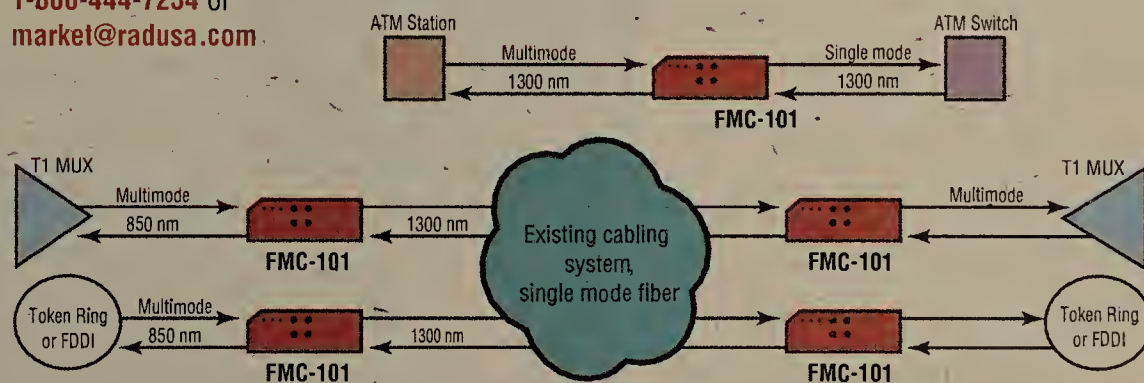


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natural gas or pipelines.

The ARIES team now comprises network managers and researchers from major oil-related companies, including Amoco, Chevron, Geco-Prakla, Schlumberger and Shell, as well as representatives from its carrier and vendor partners. The Department of Energy and NASA also participate

in ARIES, so the team includes folks from national laboratories, as well as from the space agency's Lewis Research Center and Jet Propulsion Lab.

Oddly enough, the team also includes a member of the Texas medical community. "We are working with the medical community to help it under-

stand not only what the benefit is of broadband technology, but how it could actually build networks to support it," Beering says.

Beyond bounds

Collaborative partnerships aren't new in the oil industry, but the ARIES team is really pushing technical and

political limits, Beering says. Before ARIES, an infrastructure that allowed any sort of quality intracompany interaction was nonexistent.

Cross-company teaming is essential when it comes to exploring the new oil frontiers – remote lands like Siberia, Venezuela or the deep waters of the Gulf of Mexico. The capital outlay needed to enter one of these distant regions reaches into the billions or even tens of billions of dollars, so companies must partner, Beering explains.

"The real goal [of ARIES] is to reduce the time to decision for explorations. With higher resolution images and more data, explorers can make better decisions and have successful oil finds," Cline says. "Beering has a vision of a virtual joystick used by guys on the network to control the ship at sea," he adds.

Today's reality is quite different. The lag time from data acquisition to analysis runs from one to two years, Cline says. Researchers store the seismic data on magnetic tapes, which are either flown off the vessel while it is still at sea or crated out once the ship reaches port. Either way, the vessel is long gone before the data gets to the processing center, he says.

The ARIES team has created a communications model that cuts the turnaround time to nothing. That model is pieced together with two critical components: high-speed satellites and ATM. The satellites are needed because of the remote locales, while ATM is necessary because of the massive amount of data that needs to be moved.

The ARIES project relies on NASA's Advanced Communications Technology Satellite (ACTS) program, which typically provides earth stations and satellite time for paid experiments. ACTS is a digital, gigabit-capacity communications satellite, explains Mike Zernic, the manager for high-data-rate experiments for the ACTS program at NASA and another ARIES team member.

Describing the relationship between ARIES and NASA, Beering says: "It provides the satellite to us, which is a resource we as an industry cannot afford to buy, and we provide the technology and applications. It gets a business case."

Zernic says he has never experienced anything like the ARIES project. "It's somewhat rare, at least from a government project standpoint, that we're working this closely with industry to this magnitude of breadth across an industry," he explains.

"The ARIES project has benefited everyone that has been a player," Zernic concludes. "That's why it's been so successful." ■

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The dating game

By Joel Snyder

Synchronizing calendars across the wide area.

The Alkwen proposal was coming together on schedule, but Mary in San Francisco needed to double check a few odd pricing details with Elliot in Dallas. And Elliot insisted she pull Boston-based Adrian in on a conference call for final approval before the proposal could be thrown into overnight mail that evening.

But Elliot was no where to be found and he hadn't updated other members of his local team about his plans. With the time zone difference, it seemed more and more likely Adrian would leave the office before Elliot could verify the pricing info.

Mary was going to miss the deadline.

This potboiler may be hypothetical, but the scenario is all too familiar. A relatively low tech tool might have helped Mary avoid the problem and keep her blood pressure in line: a calendar-ing tool spanning the enterprise.

Had Mary been able to log into a corporate calendar and set up an appointment late in the day when both

Elliot and Adrian were available, or even check to see where Elliot was, everything might have fallen into place on time.

Questions to ask before picking an enterprise calendar product

- Does It support true client/server operation and multiple servers?
- How are remote calendars updated, in real-time or using a store and forward technology such as E-mail? Which is most appropriate for your organization?
- Does It support the desktop and minicomputer platforms your company uses? Will it meet the needs of your remote users?
- Can you use your existing network protocols and mail system, or does it require adoption of something special?
- Will all users have to be fluent in English to take advantage of the system?
- Does It have a well thought-out GUI? Will it require significant training?
- Do you get the additional features that you need, such as project management or in/out box?



Picking a calendar manager that spans the enterprise means looking for more than the prettiest graphical user interface. You have to look at performance and scalability, platform options, network and language support, security, and additional features such as project management and real-time updating.

Enterprise-wide scheduling tools are more than personal information managers. They help you track appointments, to-do lists, regularly scheduled meetings and perform other tasks.

Enterprise-wide scheduling tools also enable team members to schedule meetings by scanning for open slots on multiple calendars and track resources such as conference rooms or audio/visual equipment. Schedulers note who is and isn't coming to a meeting and many of them also keep the meeting agenda.

The most obvious difference between workgroup and enterprise scheduling systems is in performance and scalability. To handle very large groups, most enterprise scheduling

packages use a true client/server architecture and timesharing servers, mostly running on Unix and Windows NT.

CorporateTime from Corporate Software & Technologies International, Inc. in Montreal and Synchronize from Crosswind Technologies, Inc. in Santa Cruz, Calif. depend on Unix-based minicomputers to main-

tain back-end databases of scheduling information.

But other products, such as Calendar Manager from Russell Information Sciences, Inc. in Laguna Hills, Calif., achieve scalability by enabling network managers to mix and match servers. Calendar can be deployed on four types of interconnected plat-

forms: Unix-based systems, Digital's OpenVMS, Banyan's VINES, and Novell's NetWare (as an NLM).

Since a single server won't be of much use to large organizations, communications between servers is crucial to keeping calendars up-to-date. Two models are popular: replication and direct server-to-server real-time com-

munication.

The benefit of database replication is that the WAN link between servers doesn't have to be up for a meeting to be scheduled.

But using a store and forward mechanism such as E-mail to replicate databases, as many products do, can result in calendars getting a few hours out of synch. That would make it hard to reliably schedule same day meetings.

In environments where the network is very reliable, a real-time server-to-server connection provides more up-to-date information. Products which support this style are rare: RIS' Calendar Manager is one of the few.

Platforms and networks

An enterprise scheduler is only useful when it supports everyone in the enterprise. Most highend products support the two most popular platforms, Windows and Macintosh, although a few, such as Crosswind's Synchronize, don't support Macs.

Diverse computing styles may call for supporting diverse platforms, such as MS/DOS, X windows or OpenVMS.

Palmtop personal digital assistants (PDAs) are a particularly popular "platform." As people stray further from their desks, the ability to extend the calendaring system to these lightweight tools is becoming more important.

PDA users anxious to link their isolated schedules to the corporate network might look to MSI's CaLANDar, which works with most PDAs in conjunction with an import/export application called Intellilink from Intellilink Corp. in Nashua, NH. Apple Newton users might try Portland-based Now Software, Inc.'s Synchronize.

Other packages, such as ON's Meeting Maker XP have a one-way connection to PDAs: they can export to the PDA, but can't synchronize and reconcile transactions later.

PDAs which run MS-DOS, such as those from Hewlett-Packard, and users who take notebook computers on the road will need remote support. Crosswind's Synchronize is one of the schedulers which allows for "disconnected" operation.

Disconnected operation requires you to take a snapshot of your schedule before leaving the office. When a phone line is available, your laptop and desktop databases will be synchronized.

Most schedulers will send an E-mail message to remind you of upcoming appointments, but MSI's CaLANDar takes it a step further by using mail systems to send appointment requests to users that don't have scheduling tools. With MSI's special E-mail mes-



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sage format, you can send an appointment request to an E-mail-only user who can respond using their normal mail package.

For integration into existing networks, enterprise schedulers should support a variety of protocols. This reflects the realities of global organizations: few companies have standardized on a single protocol.

High end protocol support comes in packages such as ON's Meeting Maker XP, which lets you mix and match IPX, AppleTalk, and TCP/IP pretty much at will.

Security and Languages

Different schedulers offer different security models, but the enterprise-oriented tools support a flexible set of rules which let users define their own scheduling relationships.

For example, you may be able to force appointments onto some people's calendars but have to request permission for others. Proxy support, used when one person manages the calendar for another (such as an administrative assistant), is another fairly standard feature.

As an example of one model, CST's CorporateTime separates privacy issues from permissions to schedule. A CorporateTime user can let coworkers peek at their schedule, deny them access, or provide something in-between called "view busy time only," which shows when you're free without showing what you're doing.

Individual appointments can also be marked private, which blocks access even from users who would normally be able to see the calendar. Scheduling privileges are also easy to customize: you can select who can and cannot schedule meetings with you, along with who can and cannot schedule and accept meetings on your behalf.

Bells and whistles

Some enterprise scheduling tools have their hands full just keeping appointments straight and meetings on-time. However, many offer features which work well in conjunction with scheduling, such as contact management and phone books.

For example, Crosswind's Synchronize integrates a small project tracking and management system with its scheduling system. MSI's CaLANdar offers a pegboard which shows who's in the office (and who's not, assuming that they remembered to update their calendar) along with a real-time chat utility over the network.

Other products add in legacy support to help spread their reach. CS&T has concentrated on helping IBM's Office Vision (PROFS) users migrate to their product, while RIS has built in

continuing support for Digital's ALL-IN-1 community.

Asking a single scheduling package to support an entire enterprise may be too much—for social rather than technical reasons. Some of the schedulers we looked at can scale to a 50,000 user organization. However, it's difficult to imagine that many people

agreeing to run the same package.

The vendors don't seem to care much about this problem, since there is little if any effort to standardize on a single protocol which might allow two different systems to interoperate.

In any case, the perfect scheduler doesn't yet exist. Each of the systems we looked at has some of the features

that an enterprise needs, but none of them cover all the bases.

Finding the package that's right for you will require a careful examination of the exact feature set you need. ■

Snyder is a senior analyst for Opus One in Tucson Ariz: (602) 324-0494 or jms@opus1.com

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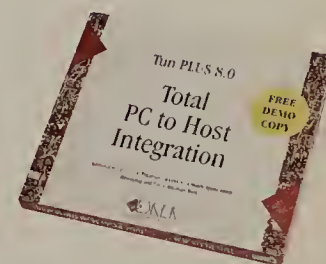
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A G E N D A

MORNING SESSIONS - 9:00-12:15

- **Hype, Health, and Heartache in IT and Communications Markets**
Vicki J. Brown, Senior Vice President
- **The Era of the Wired Consumer: Discontinuity, Opportunity, Success, and Failure**
Frank Gens, Senior Vice President, Worldwide Research
- **The Internet's Impact on Corporate Computing**
David Vellante, Senior Vice President, Systems, Software, & Storage
- **Technologies for the Wired Market**
John Gantz, Senior Vice President, Personal Systems and Collaborative Computing

Session A 1:15 - 1:55	Session B 2:00 - 2:40	Session C 3:00 - 3:40
TRACK 1		
Planet PC: The Global Market Perspective Bruce Stephen	Home Computing: Fitting and Creating Demand Richard Zwetshkenbaum	Mobile Computing and Communications in the Connected Age Randy Giusto • Michael French • Iain Gillott
TRACK 2		
Cybertucks: Mass Market Retailing Gigi Wang	Application Hosting in the Cyber Millennium Mark Winther • Michael Sullivan-Trainor	CyberAge LANs Lee Doyle
TRACK 3		
Systems & Server Market Dynamics Jay Bretzmann	Will Intel Own the Workstation Business? Dr. Thomas Copeland	Internet Servers of the 21st Century Susan Frankle • Mark Winther
TRACK 4		
Opportunity in Networked Software Dr. Anthony Picardi	Where's the Leverage: Database or Applications? Clare Gillan • Dan Kusnetzky	Can Netscape Break Microsoft's Stranglehold? David Card
TRACK 5		
Developing Channel Partnerships for Superior Service Delivery Traci Blair	Marketing Desktop Services: Hidden Costs No Longer Hidden Kurt Johnson	Distribution in the Era of the Electronic Marketplace To Be Announced
TRACK 6		
Worldwide IT Market Outlook Philippe de Marcillac	Network Computing Challenges in Latin America Paul J. Pastrone	IT Market Restructuring in the Asia/Pacific Region Davis Blair

CLOSING SESSION - 3:55 - 4:40

- **Industry Call-To-Action**
Dr. Robert Metcalfe, Vice President of Technology, IDG; Inventor of Ethernet



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COLLABORATION
Q&A

While the Web has flourished as a global collaboration tool, it lacks features necessary to support small workgroups. Lotus' Irene Greif discusses her involvement with a Web Consortium workshop examining those shortcomings.



PHOTOS BY: SHAWN G. HENRY

The keepers of the Web — The World Wide Web Consortium at MIT — recently sponsored a two-day workshop about how the Web can be used to support collaborative effort.

Who better to lead the workshop than Irene Greif, director of workgroup technologies at Lotus Development Corp. While Greif is intimate with the inner workings of the preeminent collaboration tool, Lotus Notes, her applied research group benefits Lotus as a whole and is not encumbered by the constraints of product development and marketing.

She discussed what transpired at the workshop and some of the thinking about the confluence of Notes and the Web with Collaboration Editor John Dix.

COLLABORATION: Why did the consortium sponsor a workshop on collaboration?

GREIF: It was really interesting to hear that the Web Consortium thought they were not supporting collaboration. The world is telling [Lotus] this story that Notes is dead because of the Web, and here are the people who know the Web as well as anybody saying, 'We don't have any groupware features.'

I think there's been an enormous turn toward new kinds of collaboration using the Web, but I think what is missing is support for small groups and the kinds of things we think of groupware supporting. And that is what the consortium is concerned about because people are beginning to try to do that work on the Web.

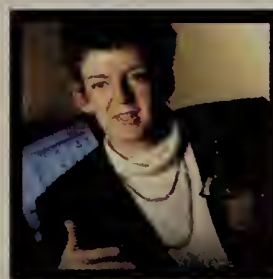
The list of things they imagine they need are all supported in Notes. Whether they are right for the Web or not is a whole separate issue. But what they're saying is the Web is just pages in a file system. We need databases, we need collections, we need a sense of place and things that hang together. We need ways of commenting on things that are there. We need ways of being notified about changes.

One of the things with Notes is the balance between using E-mail and databases, to make sure that things

are stored in a place that makes sense, where people could find out about it, etc.

COLLABORATION: Was the workshop the first the consortium had talked about collaboration?

GREIF: There wasn't a collaboration working group, but there were some collaboration pages at the Web Consortium's Web site that had pointers to people doing annotation servers and various kinds of discussion tools



"It was really interesting to hear that the Web Consortium thought they were not supporting collaboration. The world is telling [Lotus] this story that Notes is dead because of the Web, and here are the people who know the Web as well as anybody saying, 'We don't have any groupware features.'"

and a couple political process sort of systems for large-scale collaboration. So there were a fair number of people who you could say were working in this area, trying to meet particular needs of groups.

But the interesting thing was trying to figure out

whether there really was a niche for the Web Consortium in this. The rationale for inviting me was to make sure it was seen not as just a Web Consortium activity, but something that could be of more general interest.

What we set out to look for were any obvious short-term things that ought to be going into the next specs,

and if there were long-term things that should be addressed.

COLLABORATION: How was the workshop structured?

GREIF: We decided to have a day of demos to see what people had and then a day of discussion. During the demos we tried to keep a list of issues to revisit the

next day. We spent some time the next morning working through some scenarios, trying to get people to think at the application level because there was a tendency to try to go quickly from the set of demos to figuring out the standards issues.

So we broke into groups to talk about a number of application areas

where there might be interesting stories to tell about how people might work if they had a richer set of Web tools. All the stories had in common a sense of process, where you really needed very different tools at different points in time.

In a review process, for example, you might want to be careful about whether reviewers see each other's opinions until after they formulated their own. And then when a judgment is made on a paper and it needs to move through a process, you might need to have them talk to each other.

"The rationale for inviting me was to make sure it was seen not as just a Web Consortium activity, but something that could be of more general interest."

In a standard setting there would be a sense of, are people who are appropriate to bring into the discussion at one point a different set at another point.

COLLABORATION: So how many working groups were formed from the workshop?

GREIF: There were proposals for at least a half a dozen possible working groups. I think probably some of those fizzled even before the end of the day. But some of those that had commitment were notification and annotation.

COLLABORATION: What are those about?

GREIF: If I've published a bunch of Web pages and I'm paying for the service and the disk space that those pages are on, I may not be willing or interested in accommodating annotations. So how is the world going to be organized so that there can be annotations?

Should there be annotation servers that are separate, that are maintained by interested parties, disinterested parties? And how will those annotations be linked to things? I mean, if you write a disparaging comment about something and two days later the document you're pointing to is corrected, is anybody going to notify you, is your annotation going to go away?

So the set of issues around annotations had not only to do with technology, but also issues of service providers and how we could even accommodate these things in the world.

COLLABORATION: And notification?

GREIF: The Web, like Notes databases,

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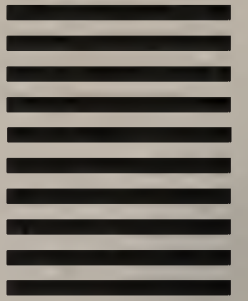
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are passive. It's a great place to put stuff, but how do people find out about it? There's a need for a notification service that would let you know if important changes have stayed, etc. They would let you know when links are not fresh anymore, or maybe something that you're pointing to is changed, so you ought to think about changing your comments. And so...

COLLABORATION: This seems like fairly rudimentary stuff.

GREIF: In some ways, yes. That's not to say that they won't get to a good place eventually, because the Internet and all the various services on it have evolved rapidly. But there are certain gaps that have come to the attention of developers and they are trying to fix them.

Lotus has experience with a complete system that integrates all these things. There are lessons that will be learned over again on the Web as the different technologies fall in place.



COLLABORATION: Generally speaking, where do you think Web technology stands in terms of supporting collaborative environments today?

GREIF: Well, you have to be really clear about which kind of collaboration you mean, because the Web does not have the ability to support small ad hoc groups forming and doing work together, where people know it's private and they can change their mind about exactly who's involved and who isn't and grow their group as they need to and change their work practices without having to shift to a whole new technology. That isn't there.

If you look at wide-scale collaboration on the Web, with people helping other people they've never met, it's a phenomenon we haven't really seen in Notes. Notes is focused on support for small groups and attention is paid to individual organizations and just doesn't lend itself to just putting information out there for anyone.

That's not to say that it can't support this application. And it's not to say that the Web can't evolve a bit to support small groups. But there's something about the nature of the technologies that caused different phenomena.

The other thing is the Web is putting incredible pressures on organizations to gather up information and make it accessible. And it turns out that's a groupware application, that's the stuff that Notes is good at. But it's interesting to see the technologies cause different kinds of things to happen in the organizations.

COLLABORATION: As the Web gets more Notes-like and Notes gets more Web-like, any thoughts on how the products will be used together?

GREIF: It's not at all clear that there has to be a winner or should be a winner. There's no question that a lot of the technologies that are in Notes will be reinvented and reimplemented in different

forms of the Web.

It will be interesting if the Web model of "download a piece at a time until you've got a critical mass of features" draws in different sets of people than Notes has. So the reinventing of technology on the Web might cause it to affect a different set of people.

But I think Lotus is understanding

that and we're trying to make our product more accessible to people of the Internet community and of the Internet mentality. Even if it is something like making an early adopter's version of Notes available on the 'Net or having Notes servers on the 'Net so people could get to their servers with anonymous access. Being part of that

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community so people get the kind of casual exposure they get to things on the Web could make Notes just as accessible to people as the Web technology has been.

We've consistently and deliberately sold into large corporations and business settings. And the Web's taken a very different route. And so they've

had different audiences and different effects on those audiences.

COLLABORATION: Do you see some organizations strictly going one way vs. the other?

GREIF: Even the most committed Notes user is not going to shut their eyes to the Internet. So the question would be

whether people who have been exposed to the Internet only and not Notes will come to appreciate Notes and want to incorporate it as well. And I think that's possible. When I go to a workshop like this and hear the academics and the freeware software people asking for exactly the technologies that I know are in Notes, I think, well, they may need to

hear about Notes and they may want to use Notes.

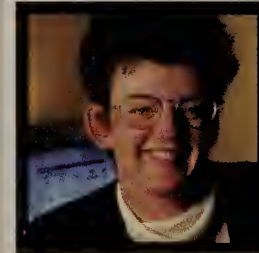
COLLABORATION: Regardless of the technology, whether it's Web- or Notes-based, how do you see these collaborative tools changing the way people work?

GREIF: Well, with Notes and the Web we are mostly talking about asynchronous communication, people working together without having to be the same time or same place. And what we see over and over again when we look at the people who are successfully using technology, are all sorts of social systems that are really supporting their use of technology.

For example, we looked at the customer support organization here at Lotus to dispel some myths about technology—that maybe we won't need customer support because people will go to the support databases themselves; or maybe the customer support people still have to exist, but they can all work from home and just go to the databases for the answer.

Well, when you watch what's happening you appreciate the limits of technology and the value of people.

In customer support, people call up with the wrong notion of what's wrong and a good support person re-registers the problem and walks them through a discussion. But if somebody with a wrong idea about their problem dove into the best Web search tool or Notes search tool, they'd go down a lot of dead-ends.



Customer support personnel who have access to huge Notes databases full of problem reports also do things all

day long like looking over cube walls to find somebody else to ask for advice. So the best customer support person will still ask for advice and want to be pointed places.

So it's clear that the ability to talk to someone face-to-face matters enormously in making it possible to make good use of Notes.

None of these people think they can do their job without Notes and all the databases. But whether they knew it or not, it is also clear they couldn't be doing what they do without the support of other people.

So real time communications, which we're starting to address with Notes, makes an enormous difference. And either we have to find ways to support it by technology, or we have to realize that we're always going to have this interesting mix of people being co-located as well as supported by technology. ■

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Why doesn't Microsoft understand groupware?

BY JEFF HELD

When it came to groupware, for some inexorable reason Microsoft abandoned its tried-and-true strategy.

Microsoft has been marching toward dominance in almost every area of software, with one notable exception: groupware. Why is that?

Microsoft is the definition of a marketing driven organization. It has been so successful because of its superb marketing strategy, coupled with enough (mostly) good products to deliver on that strategy. All I know is that when it comes to groupware, Microsoft just doesn't get it.

Microsoft's groupware strategy

If I wanted to be mean, I'd just leave this section blank. However, I will try my best to explain what Microsoft's strategy appears to be. I'm basing my analysis on several things: discussions with Microsoft executives and Microsoft customers, use of Microsoft products and Microsoft's statements to the press.

Microsoft's groupware strategy has been through several evolutions. The first attempt I recall was based on using

Microsoft Office, Visual Basic for Applications and OLE to glue together applications that collectively provide groupware functionality. This strategy never had a chance and sank without a trace shortly after being introduced.

The next attempt was Exchange. Exchange began as a messaging engine, but started to acquire groupware features such as replication and shared folders along the way as Microsoft began to feel more pressure to compete with Notes. Based on the just released Exchange 4.0 (which jumped right to Version 4.0 without the bother of going through Versions 1 through 3) and

Notes Release 4 (which actually did have three prior versions) it is very clear that Notes is years ahead on groupware functionality. Even Microsoft has had to admit this, and recently stated that Exchange is not really the "Notes killer" product that was originally advertised. Exchange is unquestionably a fine messaging engine, however, and should be very successful in that market.

Microsoft's latest strategy, as far as I can tell, seems to be a combination of the first two. Exchange provides the messaging and replication infrastructure, while Visual Basic and Office provide the application capability.

This latest attempt is still pretty weak. Compared to the out-of-the-box capabilities of Notes, the Microsoft solution still seems to require the user to do a lot more work to glue all the pieces together. Microsoft is nothing if not persistent, however, so it may eventually come up with a viable strategy.

In the next two years, however, I don't see anything from Microsoft that will really compete head-to-head with Notes. I also suspect that Microsoft may not even regard groupware as a discrete market anymore, and may decide not to develop a

specific groupware product.

The interesting aspect of Microsoft's latest strategy is that it is dramatically different from the strategy Microsoft has used in other software markets in one key way: It is not emulating existing products. Microsoft has never been shy about adopting features of competitive products, and just doing a better job of marketing them.

In fact, Microsoft's strength has been to take over markets that other vendors have created by building better products. Most of Microsoft's big successes (Word, Excel, Office, Windows 95) followed this pattern. Given that record of success, why didn't Microsoft use the same strategy against Notes? I suspect it would have succeeded.

So the question remains, why doesn't Microsoft understand the groupware market? Unfortunately, I don't have the answer to that one. And neither does Microsoft.

IBM/Lotus update

The news here is mostly good. It appears that the executive departures have run their course, and the new executive team at Lotus is pretty capable.

I have been particularly impressed by Mike Zisman. Of the several times I've heard him speak, he has done a better job of articulating the Lotus strategy than anyone else at Lotus, including Jim Manzi, has done in the past. He also has a very effective speaking style – direct and understanding – that goes over well with customers.

The other good news is that Ray Ozzie has apparently decided to stay on. I've heard the same reports that everyone else has about Microsoft wooing Lotus developers, but I'm not too worried about that. Lotus is situated in one of the great hotbeds of technology talent, so I doubt that the loss of some developers would be crippling.

I'm also pleased to see that IBM is pursuing the strategy of linking Notes to its enterprise products. I discussed this in a prior column, and noted that it would give IBM/Lotus a capability that even Microsoft couldn't touch. The MQ Series looks like a slick way to link into the legacy world without the ugly "screen scraping" approach that is so often used.

I'm also amused at the plans to make the AS/400 a Notes server, but I guess it shows that IBM is serious about integrating Notes into its product line. Of course, while strategy is nice, it's execution that determines winners and losers. Execution was never a strength of the "old" IBM. Let's hope the new IBM does better.

I wonder if anyone at IBM has thought about an MVS Notes server. This isn't as idiotic as it sounds. One of the major problems faced by all large Notes users is maintaining the huge number of servers needed to support tens of thousands of users. Even with the latest Unix boxes, when it comes to raw horsepower, nothing beats a mainframe. ■

Held (jeffrey.held@ey.com) is a partner in the Center for Technology Enablement at Ernst & Young LLP.



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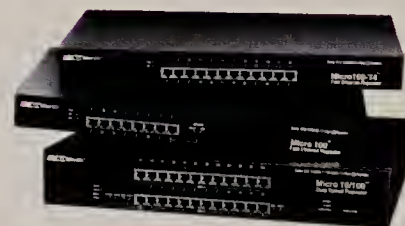
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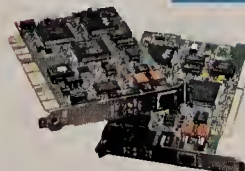
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Larry Ellison, technical specialist, NSK Corp., Clarinda, Iowa

Creating a miniserver that runs a five-user version of NetWare 4.1 and ARCserve on that platform is strongly recommended, says Ron Nutter, author of *CD HELPDisk Series: Novell Products* (a CD-ROM published by Charles River Media, Inc.) and a Master Certified Novell Engineer and Compaq Accredited Systems Engineer in Lexington, Ky.

ARCserve can present a rather heavy load when used in certain configurations. Try moving your Mirror Server Link cards to a lower interrupt value such as int 5 or int 2. Such settings give higher priority to backup than the other devices in either server. Doing this should help to keep your backup link running more reliably.

Novell or Cheyenne should have supplied you with a version of CLIB, a run-time library that NetWare uses for functions common to all NetWare Loadable Modules, written specifically for the NetWare 4.1 and ARCserve combination. Check to make sure you have LIBUP6 for the latest CLIB and STRTL4 for the latest SPX patches.

Also, check the amount of memory you have in both servers and make sure the cache buffers hit at least 60% with ARCserve loaded and performing a backup.

One last thing: Get in touch with HP technical support to confirm that you have the latest flash update for the basic I/O system read-only memory on the motherboard of your servers.

ISDN D Channel Packet service: Coming soon to a store near you

By James Sturgess

Local ISDN service has come to be regarded as a solution for small office/home office users who want dial-up network access at speeds higher than those supported by analog modems. But some companies might soon be installing an ISDN line for a much different reason.

The phenomenal interest in the service last year and predict-

existing voice switching infrastructure. Similar to a voice call, an ISDN connection can be initiated and two remote points connected by one or more 64K bit/sec digital links. These 64K bit/sec pipes, commonly referred to as B or bearer channels, are provided by carriers in bundles of two ISDN Basic Rate Interface or 23 Primary Rate Interface connections.

plexed with the ISDN control signaling information, provides a 9.6K bit/sec X.25 connection. With the service, companies can get a permanent connection to their local carrier's X.25 network, which, in turn, connects to other public data nets.

While D Channel Packet service does not provide enough bandwidth for most LAN-based applications, it often boosts con-

For links to more details on D Channel Packet service, jump to Network World Fusion. Pick NetRef, Technology Resources then WAN Services.



Why use the D channel?

Retailers, banks and lottery organizations are primarily attracted to D Channel Packet service because it provides an inexpensive networking solution. Some carriers offer a very low-cost BRI service, called 0B+D, that disables the B channels. They usually charge set monthly access and per-packet usage fees. Depending on a customer's location, the monthly cost of 0B+D service and the packet charges for a typical ATM or lottery terminal can be as low as \$30.

ISDN service also lets users replace multiple telephone lines with a single BRI connection. With a full 2B+D BRI line that supports D Channel Packet, a retailer, for instance, could connect a phone and a credit card scanner to the B channels and devices such as a lottery terminal or automatic teller machine to the D channel.

It also can connect an access controller to the D channel so even more POS terminals can be supported.

These benefits make ISDN the perfect service tool for a business looking to reduce telecommunications costs while simplifying the network.

Sturgess is the senior marketing manager for ISDN and frame relay access products at Motorola Information Systems Group in Huntsville, Ala. He can be reached at (905) 507-7339 or via the Internet at LJS006@email.mot.com.

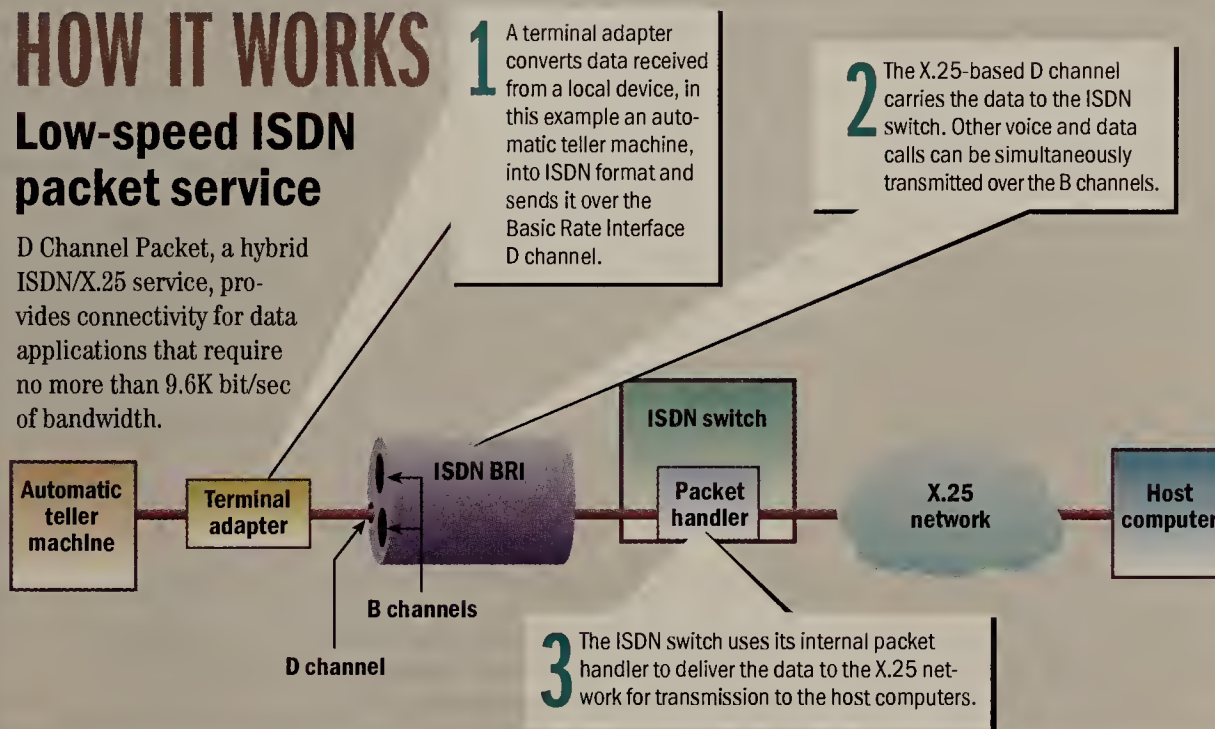
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HOW IT WORKS

Low-speed ISDN packet service

D Channel Packet, a hybrid ISDN/X.25 service, provides connectivity for data applications that require no more than 9.6K bit/sec of bandwidth.



ed growth for 1996 and beyond show tremendous promise for the dream of ubiquitous ISDN access worldwide. Initiatives to give remote users access to corporate networks and connectivity to the Internet from home have pushed carriers to upgrade their networks and provide ISDN service to more locations.

Support for on-demand 64K and 128K bit/sec access is the major force driving deployment, but other specialized corporate applications are generating interest in ISDN, too. Retailers, for instance, are beginning to tap into the potential of D Channel Packet service, a hybrid of X.25 and ISDN.

Back to the basics

ISDN was designed to provide high-speed digital connectivity in 64K bit/sec increments on a demand basis using a carrier's

Unlike a regular voice call, which utilizes in-band pulses or tones for signaling, an ISDN call employs a separate signaling path, called the D channel. The ISDN device at the user site establishes a call using the D channel to signal the switch to which it is connecting. The D channel operates at 16K bit/sec in an ISDN BRI network and at 64K bit/sec in PRI mode.

D is for data

Most people think of the D channel as being exclusively for signaling information, but it also carries data packets.

Using the packet handlers found in their ISDN switches, carriers can configure a simple X.25 data link over the D channel to the customer's terminal adapter, or ISDN modem, at the end of the BRI.

This link, which is multi-

nectivity speed for a plethora of automatic teller machines, lottery terminals, cash registers and other devices used for point-of-service, point-of-sale (POS) transactions. These devices typically run on analog multidrop lines of 9.6K bit/sec or lower.

D Channel Packet lets carriers combine their ISDN and X.25 networks to provide a hybrid service for low-speed data applications. It allows low-cost file transfer and database access, for example.

In this case, ISDN BRI provides network access for the device at the remote site; the host computer uses conventional X.25 access. Since many retail point-of-sale and lottery applications now run over public X.25 services anyway, using D Channel Packet service at the remote site requires no changes at the host location.

EDITORIAL INSIGHTS

Better watch your step

If the demise of AT&T's Network Notes caught you off-guard, brace yourself; there are plenty more surprises down the road.

With the combined effects of the Internet and telecom reform, the next few years will witness the rapid evolution of new services — some of which will have the lifespan of a high-tech fruit fly.

Carriers, cable TV providers and others will be racing in new directions and pairing in unforeseen ways to position themselves as leaders in the new network world. Problem is, most will act before customer demand for new services is clear and before anyone understands how the market will take shape.

Case in point: AT&T. The company has already abandoned several high-profile on-line initiatives (the Interchange network, Network Notes, et al) it feared would be made obsolete by the 'Net. This grand experiment would be fascinating to watch were it not being conducted in the petri dish of your network. Network managers who, for example, embraced Network Notes now find their strategies and credibility rather damaged.

So, while the air rings with all the promise of telecom reform and the Internet, keep in mind that you'll be expected to perform quite a balancing act. You need to take advantage of new services that can make your company more competitive, but you have to avoid being victimized when your supplier makes a sudden about-face.

But how do you do that when, as AT&T has proven, dealing with even the biggest companies is no guarantee of safety? (The concept of Network Notes was solid — as Houston-based WorldCom is proving — in stark contrast to AT&T's commitment.)

The secret lies in viewing these new services the way their suppliers do: as experiments, market tests, trial balloons. Ignore the grand prognostications (AT&T predicted Network Notes to be a \$2 billion-a-year service) and use these offerings to learn about new technologies and new ways to support end users. If the services take off, you'll be way ahead of competitors in wide-scale deployment. (I'll summarize that as Gallant's Law: Don't find yourself more committed to a service than the supplier.)

Make sure management knows you're experimenting and why. And be sure to have a graceful exit plan in case all else fails.

John Gallant, editor in chief

jgallant@world.std.com



Teletoons

By Phil Frank and Joe Troise
guru@well.com

The Future of Networking No. 121

Running afoul of the new Antismut Provision of the Telecommunications Act of 1996, all presidential candidates will be heavily fined for posting the full texts of their recent speeches on the Internet.



TOLLY ON TECHNOLOGY

It's time to address some of the things we still don't know about ISDN

Some years ago, when ISDN was still the bandwidth equivalent of vaporware, pundits enjoyed coming up with evermore clever (and sarcastic) ways of spelling out the acronym. One of my favorites, which took liberties with the spelling, was "I still don't know." For, at the time, many analysts saw ISDN as a solution in search of a problem.

But all that is behind us now. Network managers, vendors and analysts today recognize the need for what ISDN has to offer.

Even a connection using the most basic ISDN link of 64K bit/sec more than triples the bandwidth of most analog offerings. Furthermore, two 64K bit/sec channels can be run simultaneously as a single, logical 128K bit/sec pipe. Add features such as real-time data compression, the capability to drop the link automatically when not in use and near-instantaneous connect time, and you have all the signs of a real winner.

It is no wonder, then, that in this bandwidth-hungry but cost-conscious world, ISDN is figuring in the plans of many users.

Yet "I still don't know" is the answer net managers must too frequently give to upper management when queried about various aspects of ISDN. Here are some of the things we still don't know:

First, why don't some regional Bell operating companies even admit to offering ISDN? It is certainly embarrassing after talking your boss into deploying ISDN to call your RBOC representative and have him claim never to have heard of the service.

Second, why are ISDN WAN charges so high? (After all, ISDN was supposed to save users money.) By now, you've no doubt read somewhere that you have to be careful or your ISDN links will stay up constantly, driving up your costs. What you haven't read is that normal campus network activity will, by default, keep ISDN links to remote sites up 24 hours a day, seven days a week.

Got bridges somewhere in your network? Those automatic Spanning Tree updates will trigger the ISDN bridge/router to connect to the branch office to deliver those frames. Using Windows for Workgroups or Windows 95 peer networking? Even if you are not using these functions at your branch, the NetBIOS broadcasts will, by default, be forwarded across a bridged ISDN link.

While many vendors offer spoofing schemes to limit some of the spurious traffic, net managers will have to look at their traffic under a microscope and carefully construct filters to reduce or eliminate the constant up-and-down of the ISDN links.

And, don't let the mere presence of the word "spoofing" on a router spec sheet allay your fears. Where many of the exotic functions of routing are more art than science, spoofing is more black art. Vendors that implement spoofing must reverse-engineer the protocols that are to be spoofed. Just because a product can successfully spoof, say, NetWare 3.12 sessions does not mean that it will automatically work for NetWare 4.X. Additional



Kevin Tolly

management flows in later releases require updates to the spoofing code.

In every case, spoofing code has to maintain a precarious balance with the sessions and management traffic it handles. One of spoofing's main jobs is to respond to NetWare keep-alive packets. Doing this allows the logical NetWare session to remain intact even

when it is idle and the ISDN link is properly down. But what happens when the remote client really is down? How does the host-site router know that? How long will it keep that session alive? Network managers might find themselves now concerned with such minutiae.

Third, why can't we figure out why ISDN charges are so high? Most router vendors treat ISDN as just another interface. And in most respects, it is. Until now, every router interface, LAN or WAN, has provided permanent, dedicated bandwidth. As a result, accounting for usage was never an issue. With ISDN, usage is everything.

Suddenly, we have to embrace a new concept: router as PBX. Imagine if your company's telephone system did not offer call detail reporting and all you received was a bill from the phone company. Trying to sort out usage and bill back the proper departments would be a nightmare.

Unfortunately, that is how it is with most of the ISDN boxes we've seen to date. While some vendors may pay lip service to accounting, there is little to help the net manager. Most vendors don't seem to understand the primacy of usage and control thereof.

When that whopper of an ISDN bill comes in, the router offers little or no assistance in helping the net manager analyze and tune usage. The only alternative is to plug in LAN and WAN analyzers and institute around-the-clock monitoring by a technician until the bandwidth culprits are caught. The manpower costs of doing this could easily negate some of the cost benefits of moving to ISDN in the first place.

And those are only the obvious questions. Earlier, I said that many ISDN routers allow two channels to be bonded together to act as one pipe. Since most RBOCs charge by the channel, doing this doubles your per-minute charges.

But, you say, the job gets done twice as fast. In theory, perhaps. In practice, we've observed live data-mover applications running about 30% faster over a 2x64K bit/sec link. Hmm, twice the price for a 30% improvement? Let's hope your manager doesn't ask you to answer that question.

There's no doubt that ISDN is a great benefit to network managers. We cannot afford to ignore it, but we cannot afford to be enamored of its theoretical beauty and ignore its real, but solvable, practical challenges.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (908) 528-3300 or via the Internet at ktolly@tolly.com.

Microsoft shoots for World (Wide Web) domination

Edwin Mier

It's likely that by the time you read this, at least 30,000 user organizations already will have kicked the tires of Microsoft Corp.'s brand-new Internet Information Server (IIS).

We did here in the labs, and it's pretty good.

Combine that with its price tag — zip if you download it; around \$90 if you buy the CD-ROM pack through formal distribution channels (that is, if you can't get a copy thrown in with your next software purchase) — and you've got what amounts to a full frontal assault by Microsoft on the World-Wide Web marketplace.

So is it all over for the competition? Should the nearly 20 vendors now shipping Windows NT-based Web server software packages — including Netscape Communications Corp. with its new Enterprise Server 2.0 — just fold their tents and go home?

That may be the ultimate outcome. It depends on what Microsoft is up to and what new moves it makes over the next few months.

Is IIS the definitive Web server? No. IIS is not invincible — at least, not yet. Based on our assessment, almost all of Microsoft's NT-based Web server competitors offer appreciably better capabilities and facilities in four key areas: Web page authoring and creation, graphical management of Web pages and sites (HTML files and documents), usage reporting and remote administration (limited to an NT workstation with IIS, for now).

In a briefing at our offices last month, Microsoft's IIS program and product managers were quick — you might even say careful — to portray IIS as a "foundation Web server platform." The product was intentionally left skimpy in some of these higher layer functions, they said — ostensibly so that third-party software vendors would still have something to do.

Has Microsoft adopted as a strategic tool what the Justice Department affectionately refers to as predatory pricing? That's when a big fish enters a market and undercuts all other's prices, selling its wares at a loss until its competitors are driven out of busi-

ness. And then, the theory goes, the predator's price skyrockets.

Is it predatory to give your product away? Clearly, it costs Microsoft to produce IIS.

Microsoft's answer is: "Well, we're folding it into the next release of NT Server, and then you'll have to buy NT Server to get it." I suppose that's true. (I've been assured that the current beta release of NT Server 4.0 does come replete with IIS. Expect the new release about midyear.)

The point is, Microsoft could have just integrated IIS into the next version of NT Server and been done with it. But Microsoft didn't. It had to get IIS out now to head off competitors.

I'll bet 50% of organizations looking to select a standard platform for their *intranet* strategies will be finalizing their decision over the next six months.

And now, IIS is among the available choices. It wouldn't have been if Microsoft had made users wait for NT Server 4.0.

I think 10 or 12 of the vendors of NT-based Web server software won't make it long as a result of Microsoft's rollout of IIS. That's because IIS gives you enough to do your Web server job — lean higher layer features notwithstanding.

Will Microsoft fill in these higher layer thin spots with its own new software releases? Well, now that Microsoft has acquired the Vermeer FrontPage Web page-authoring tool, I'd say you can bet on it.

So is that predatory? Or is it just business Darwinism as usual (that is, natural selection — survival of the fittest)? You be the judge.

But I'll bet that a year from now, more than 90% of NT-based Web servers are running IIS.

Mier is president of Mier Communications, Inc., a Princeton Junction, N.J.-based network consultancy, which recently published a special report on Web servers. He can be reached at (609) 275-7311 or via the Internet at ed@mier.com.

In the immediate vicinity of the main Frankfurt railroad station are sex shops featuring videos, movies, posters, and S&M and bondage paraphernalia in their window displays. I looked for, but did not find anywhere in the area, signs warning parents to cover their children's eyes.

Politeness directs me to describe the German government's public position and statements as disingenuous, but I feel it is more appropriately characterized as deliberate, hypocritical, political manipulation of public opinion. This is known in the U.S. as demagoguery.

*Eugene Robkin
Baraboo, Wis.*

The ROI puzzle

Regarding your editorial "That mysterious ROI" (Feb. 5, page 32):

Within my organization, we perform a zero-based budget each year. New acquisitions of any magnitude require a benefit analysis, of which return on investment is a major part. I believe that we, as network professionals, must be able to demonstrate our value to the organization.

Your point on the numbers being soft is correct. We make general assumptions,

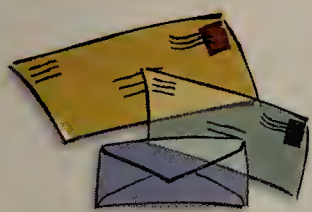
which we document. If management questions the validity of the assumptions, we ask for their thoughts on how to correct them. Getting management involved at this level makes them become part of the solution, and support arrives instantly if your methodologies are sound.

The "line-of-sight" involvement of the IS customers cannot be overstressed. We, as IS professionals, must know our company's business and guide it in applying new technology for business gains.

*David Belangia
Automation technology manager
Bechtel Hanford, Inc.
Richland, Wash.*

I heartily endorse the idea of more "line of sight," to use John Danielson's term. However, as you point out, when it comes to making the case for investments in information technology (IT), we need credible numbers.

IS executives can and must use more rigorous techniques to deal with the inherent difficulty of ascribing value to information itself, and other intangibles and risks. My organization believes this begins with a vision of the role IT will play in the firm's business. We have developed a project *See Message queue, page 52*



IN-BOX

Double standard?

One thing that has been missed in all the uproar over the German government's Internet censorship actions is a comparison of what the Germans actually allow within their culture on an everyday basis vs. what they complain about on the 'Net.

I just returned from a short trip to Germany, and one thing that struck me at once was the amount of printed and pictorial vulgarity on public display.

As a case in point, in the main railroad station in Munich, there is a small newsstand with the equivalent of *Playboy* and *Penthouse* magazines hanging in the windows for the benefit of the train passengers.

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Voice over ATM

The long road to network nirvana

By Beth Gage and Liza Henderson

If you've been itching to use ATM to carry voice along with your other WAN traffic, there's good news and bad news. The good news is that it can be done. The bad news is that it ain't easy, it's not flexible and it certainly isn't cheap.

Only bleeding-edge network managers have even tested voice over Asynchronous Transfer Mode, and none of the major carriers have any customers sending their daily voice traffic over an ATM WAN.

Nonetheless, voice over ATM is definitely on many of your minds. Over half of the 100 net managers surveyed last fall for the *Network World* 1996 Technology Planning Survey said they planned to install ATM this year. Of those, more than 40% indicated voice would be one of the applications riding their ATM net (*NW*, Dec. 25, 1995/Jan. 1, 1996, page 74).

Follow-up interviews indicate these plans may well be delayed due to the generally slow pace at which ATM is working its way into user nets. But the potential cost savings of several cents per minute remains a driving force behind the idea of consolidating voice with data, image, video and other traffic. There are many visions

of this utopia, including one that has plain old telephone service riding on an ATM network infrastructure. Most carriers expect there will be advantages to this type of consolidation once ATM technology matures, but the date for this merger is cited sometime in the 2010s.

A vision held by network managers, meanwhile, has voice supported at the desktop by a multimedia application while ATM is used both in the local environment and over the corporate WAN. Today, there are desktop data applications that packetize voice and include it in the data transmission. If the LANs are connected by an ATM network, you can have voice and data over ATM without a lot of hassle.

However, you can expect suboptimal voice quality and few of the call-handling features to which users have grown accustomed. For example, what if you call someone at a workstation and no one is there? How will the call be routed to a secretary, operator or voice mail? Lots of development work remains.

Similar issues exist in linking LAN-based ATM voice nets with existing corporate private branch exchange networks. The biggest challenges lie in providing in ATM nets the same features and functionality available in PBX environments, such as call forwarding, redial and three-way calling.

Migrating private, time-division multiplexer (TDM)-based voice networks to ATM is probably the most realistic short-term goal, but even this has complications. "In the short-term, voice over ATM is limited to providing a substitute for private lines," says Ron Toth, InterSpan ATM product manager at AT&T. "There are still several functions that need to be addressed, such as [switched virtual circuits], billing, fraud detection, call pickup and even voice mail."

Not to mention cost. Simply put, migrating intracompany voice to an ATM network is not for the frugal.

First, ATM customer premises equipment (CPE) for voice is more costly. Second, and most important, the ATM class of service that you will need to support voice — constant bit rate (CBR) in most cases — is priced at a premium vs. private lines at the same bandwidth. Carriers justify the extra cost by pointing to the better service ATM provides with its reroute capabilities.

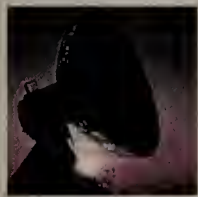
Even so, bullish ATM CPE vendors claim their customers' payback period is



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between eight and 12 months. But adding up the equipment and ongoing ATM costs just for the voice traffic and comparing that to your per-minute rate for voice service is not a simple exercise.

Technology hurdles

Likewise, there are a number of issues to consider when building these private ATM-based voice nets.

There are two main approaches to traditional PBX networking. The first is to use private lines to connect corporate PBXs. The second is to connect each PBX to the public voice network and subscribe to a virtual private network (VPN) service. Private voice networks require that you maintain network routing tables in each PBX. With VPNs, the PBX routing tables are managed as part of the service.

In either case, PBX voice trunks can be migrated to ATM. However, providing optimal support for the trunks requires interpreting inter-PBX signaling, such as that provided via the Signaling System 7 (SS7) network in North America.

Interpreting these signals provides many benefits. Fax and data calls can be handled differently than voice calls. Call routing can be optimized to improve network availability and costs. Dialing plans can be maintained centrally. Certain calls, such as international or overseas calls, can be compressed to provide better network efficiency.

But there are two main problems. First, there are dozens of different SS7-like voice signaling systems used around the world.

Second, there are as yet no mechanisms in place that enable ATM nets to interpret these various signaling systems, and it isn't clear when there will be.

Another technical challenge is addressing delay during the end-to-end voice transmission process. Delay can be introduced when adapting the voice sig-

nal into an ATM cell stream and at the egress of the ATM network, where cells must be buffered to minimize the effects of network jitter. If a call is routed through intermediate PBXs, these delay components are compounded since at each juncture traffic must be converted from ATM cells to a voice signal, then back to ATM cells.

ATM does have a quality of service parameter, dubbed Cell Delay Variation Tolerance, that is designed to keep the variation in delay between cells to a minimum. The cell transit delay (CTD) parameter is a combination of propagation delay and network node processing delay for queuing, switching and routing. But there has not been enough testing of voice over ATM to understand the optimal settings for these parameters and what happens in a real-world environment. In other words, there's no proof yet that it works.

An additional technical issue that can easily be overlooked by the data-oriented folks who are probably involved with implementing ATM nets is echo. All analog phones produce echo, which is noticeable when the end-to-end delay is greater than 32 msec. In order to avoid this problem in voice networks, carriers place echo cancelers as close to each caller as possible. These are also required in ATM networks, so look for equipment outfitted with integral echo cancellation features.

The chart on this page sums up the features various vendors offer on their ATM platforms.

Reality check

Additionally, there are several leading PBX manufacturers that offer, or plan to

offer, ATM interfaces that will let you replace TDM-based voice tie lines with ATM circuit emulation connections. But these connections use ATM's constant bit rate (CBR) class of service, which provides no statistical multiplexing benefits and is as wasteful of bandwidth as its TDM counterpart. Variable bit rate (VBR) or even available bit rate (ABR) service would at least provide some efficiencies.

With circuit emulation, the 24 64K bit/sec channels on a T-1 are mapped to an ATM CBR virtual connection. Generally, not all of the 24 channels are defined as PBX trunks, and only a small percentage are actually in use at any given time. The result is wasted bandwidth. In addition to reserving bandwidth for unused channels, ATM adds overhead with its 5-byte header. To support a 1.5M bit/sec T-1 link, the ATM circuit must be set at 1.7M bit/sec.

Like intermittent data applications, the very nature of voice calls does not justify fully dedicated bandwidth — only one person is typically talking at a time and there are likely to be gaps in speech. Most private voice networks are engineered to support peak traffic periods without blocking any calls, so the majority of the time considerable network bandwidth is unused. Using dedicated bandwidth to support such intermittent voice applications is inefficient.

Unfortunately, so is using the CBR class of service over ATM. It is just as wasteful of bandwidth and does not provide the statistical multiplexing gains that we typically associate with cell switching. The bottom line is that there is no benefit to using CBR service for voice.

But this does not mean that voice appli-

Like intermittent data applications, the very nature of voice calls does not justify fully dedicated bandwidth — only one person is typically talking at a time and gaps in speech are likely.

WHO'S GOT WHAT?

Voice over ATM products from leading ATM platform vendors

Company/product	Features							
	ATM class of service	Voice over ATM support	Compression	Echo cancellation	Silence detection	Prioritization	Cost per voice or circuit emulation card	Number of ports per card
ADC Kentrox AAC-1/AAC-3	CBR	✓				✓	\$2,000	1/4
Cascade Communications Cascade 500	All	✓				✓	\$6,000 and up	8
General DataComm Apex	VBR, CBR	✓	✓	✓	✓	✓	N/A	4 T-1/E1
NEC America Atomnet/M7	CBR	✓				✓	\$8,500 (T-3) \$7,500 (T-1)	4
Newbridge Networks ATMnet 36150	CBR	✓				✓	N/A	1, 4, 8
Nortel Magellan Passport 50 and 160	VBR-RT	✓	✓	✓	✓	✓	\$13,500 with software	1 T-1 2 T-1 ('97)
OnStream Networks CS600 ATM Access Concentrator	CBR						\$8,000- \$12,000	4 T-1 8 T-1
StrataCom IGX	VBR, CBR VBR-RT	✓	✓	✓	✓	✓	N/A	1 T-1/E-1 channelized



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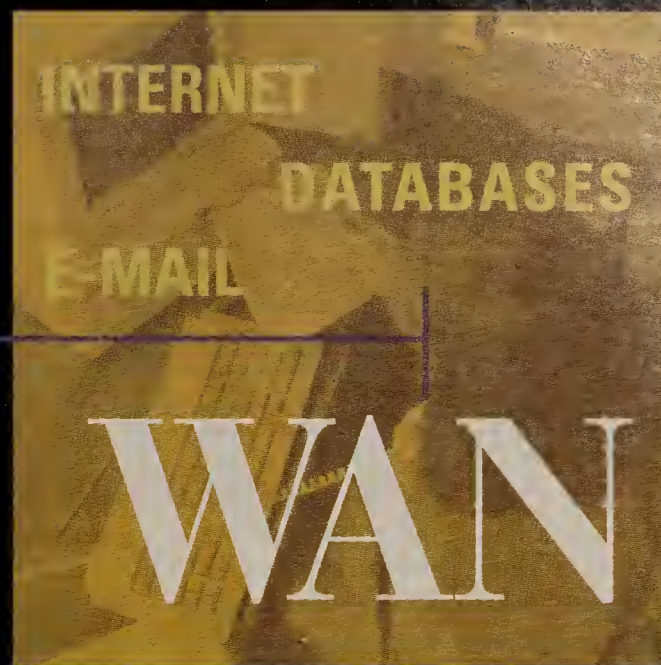
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cations don't belong on an ATM network, nor does it mean that ATM can't help increase bandwidth efficiency and reduce costs for voice applications.

The solution? "To be efficient, voice over ATM will require VBR real-time class of service," says Steve Tabaska, vice president of data services engineering at MCI

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Key features your ATM CPE will need to support voice:

- ▶ VBR real-time class of service
- ▶ Echo cancellation
- ▶ Silence detection and compression
- ▶ Voice compression
- ▶ Prioritization of voice and fax over other traffic

Communications Corp. "At a minimum, customer premises equipment should support silence detection, provide echo cancellation and optionally offer compression."

While this would be a good start, Tabaska says it is not enough. "I don't think we'll see much migration until VPN features are supported and the signaling issues are resolved," he predicts.

The problem is mainly a lack of CPE standards. "Many solutions today for providing voice over ATM are proprietary," says Cathy Gadecki, ATM Product Manager at Sprint Corp. "There are still many standards issues that have not been resolved by the ATM Forum, including the basic issue of how to convert the traffic into ATM cells." Until standards are outlined, she says, the choices for equipment and services other than CBR and circuit emulation will remain few.

Pioneers wanted

In the public ATM service market, only one service provider offers a voice service that uses ATM as the underlying transport mechanism. MFS Datanet, Inc.'s WAVE service, which is based on Northern Telecom, Inc.'s Magellan Passport platform, is designed to keep the ATM technology transparent to users and spare network managers from learning the complexities of ATM. Customers merely connect traditional voice and data equipment to an ATM data service unit/channel service unit, which converts the traffic into a single ATM cell stream and gives users a taste of the bandwidth benefits ATM provides.

The service is currently available in Chicago, Los Angeles, New York, San Francisco and San Jose, Calif.

"Our goal is to keep it simple to the customer," says Jay Jonekait, vice president of business development at MFS Datanet. "The ATM equipment industry continues to evolve at a rapid pace. Today's leading-edge platforms will be outclassed in 12 months. With WAVE, customers are able to defer investing in ATM technology until it stabilizes."

Several customers have tested voice over ATM, although few run production voice networks over ATM right now. One

pioneering company in this arena is Nortel, which has installed one of the largest corporate ATM networks to date.

Last year, the company deployed its Magellan Passport switches on its internal network and began to consolidate its voice traffic onto a public ATM WAN. The company now has 12 Passports in 10 major sites across North America. In total, there are over 109 T-1 interfaces to the Passports, which are directly connected to locally attached PBXs. These PBXs, in turn, connect to another 64 PBXs throughout North America.

Each day, the T-3 ATM net supports over 80,000 calls and more than 300,000 call-minutes. The Passport provides voice support with the VBR real-time (VBR-RT) class of service, which confers some of ATM's statistical multiplexing benefits. The network is also used to transport over 112 million IP and AppleTalk packets per day.

"We have been able to optimize bandwidth costs and network scalability by consolidating voice and data traffic over the ATM public network," says Eddy Jones, senior manager of global engineering for voice, video and multimedia at Nortel. "The PBX configuration has also been greatly simplified by using Passport's dynamic networking features, compared

to the TDM-based network we used previously. PBX configurations will be simplified even more with the future handling of PBX routing on the ATM network."

Obviously, Nortel is in quite a different position from most companies in that it makes the ATM switches it uses. For those of you who are not in such an enviable position, things are a bit different.

First of all, given that standards for providing efficient voice transport over ATM are still in the predefinition stages, don't look for service providers to announce voice over ATM offerings before the end of the year, if then.

In the meantime, if you have the engineering staff to dedicate to testing CPE and carrier services, and some money to shell out for equipment, then go for it—it can't hurt to gain some experience even with today's limited voice over ATM applications.

Look for ATM CPE that supports echo cancellation, silence detection, compression algorithms and VBR-RT class of service. This will help avoid the use of inefficient and costly CBR services.

You'll need to work closely with PBX vendors, carriers and ATM switch vendors to solve the various technical challenges. But if you enjoy the pioneering lifestyle and like the challenges and rewards of

working with emerging technologies, then you can help create the standards for tomorrow's users.

If you don't have the resources or patience required to manage a leading-edge technology trial, don't worry. Right now, you aren't losing any money by using traditional voice services instead of ATM—it will likely be at least two and maybe five years before things reach that point. That should give you time to assess the experiences of the trailblazers who are just now starting to clear the ATM path.

Gage and Henderson are broadband consultants at TeleChoice, Inc., specializing in broadband services and equipment. They can be reached via the Internet at beth_gage@telechoice.com or liza_henderson@telechoice.com.

ON-LINE

See where the ATM Forum is in the process of developing specifications for voice over ATM on Network World Fusion. Select NetRef, Technology Resources then

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Message queue

Continued from page 43

called Vision in Information and Power (VIP), which has become an integral part of our IS investment strategy process.

VIP takes aim at two issues involved in using IT for competitive advantage. The first is the cultural gap between IS managers and business unit managers. The second is the lack of formal appraisal methods to define the shareholder value of IT investments. VIP is part of a process for justifying IT investments.

The techniques involved, however, are independent of technology; as such, they can be adapted for evaluating many types of technology investments in terms of their contribution to the bottom line.

Ron Skelton

Program manager

Advanced information technology

Electric Power Research Institute

Palo Alto, Calif.

Catchy topic

I enjoyed your article "Playing catch-up?" (Feb. 5, page 35). It aptly illustrates the problems we networking folks face as we try to get the open systems and TCP/IP folks to relate to the problems created in integrating the two topologies—SNA and TCP/IP. The SNA networking folks appear fairly well aware, but not their counterparts.

Thanks for the article. It sure will help make my job a bit easier.

Richard Hutchinson

Networking software consultant

BMC Software, Inc.

Houston

I would like to address several issues raised in your article "Playing catch-up?"

First, although SNA is a connection-oriented protocol, SNA/High Performance Routing (formerly APPN+) is connectionless.

Second, I do not think that, based on the fact that 9.6K bit/sec lines used to be sufficient for the older SNA master/slave applications, we can conclude that 16K bit/sec committed information rate would be sufficient for most SNA applications. SNA/Advanced Peer-to-Peer Networking is usually used for peer-to-peer applications that require a much higher bandwidth than the older, hierarchical SNA.

Third, the author did not address the issue of class of service (COS), used by SNA to provide priority for SNA interactive applications vs. SNA batch. To address COS issues, SNA has to be used as the backbone protocol, even with RFC 1490. IBM's AnyNet, for example, will translate non-SNA protocols such as TCP/IP, IPX or NETBIOS into SNA so that only SNA will be used over the backbone. Similarly, ATlan, Inc.'s family of products encapsulate non-SNA protocols into SNA instead of using protocol translation.

ATlan's Enterprise Connectivity Node (ECN) product takes a unique approach to the bandwidth issue. Using a technology called Concurrent Backbone Architecture, ECN allows parallel usage of both SNA and non-SNA links. When additional bandwidth is required, ECN can activate an ISDN link that can be used in parallel with the frame relay network.

Eddie Rabinovitch

Senior manager

Network and Desktop Consulting Practice

Global Customer Service

Unisys Corp.

Headline offends

Curious minds want to know: Was the headline "Carriers open up their frame relay kimonos" (Feb. 12, page 1) intended for *Network World* or the *National Enquirer*?

At first I was offended. When I found out both Japanese men and women wear kimonos, I felt better. But, please, give me a break from this sleaze.

Nancy Croll

Boston

Your headline "Carriers open up their frame relay kimonos" bothered me. The more I looked at it, the more I realized just how sexually offensive it was.

If you consider this headline an innocent turn of phrase, then you probably feel the same about "Carriers drop their frame relay pants." In any event, you showed rather poor judgment in your choice of words.

Terry Kepner

Peterborough, N.H.

Vital road map

As a soon-to-be Internet service provider for dial-up access, I look to *Network World* for the latest bleeding-edge technology information. Your articles are incisive and thought-provoking, helping me find the best way to solve networking and Internet problems. *Network World* is my road map for making critical, timely decisions.

Dwayne Sturge

President

Dwayne Sturge Enterprises

Tulsa, Okla.

By Thomas Nolle

Where will ATM applications come from? That question is at the heart of the ATM Forum's efforts to map LAN protocols to Asynchronous Transfer Mode networks and develop ATM APIs.

The forum is pushing beyond standards that simply define how ATM devices will be hooked together. It is trying to develop a strategic plan for letting new and existing applications take advantage of the unique features of ATM networks and, in doing so, is generating the most controversy the group has encountered since its contentious debate over a 25M bit/sec ATM standard.

Where will they come from?

When it comes to ATM applications, you may envision a kind of think tank where programmers are developing powerful new multimedia applications designed specifically for ATM networks. But ATM is a universal technology — equally at home in local- and wide-area nets — so any application can be an ATM application.

It is that concept — that any new or existing application must be able to exploit ATM's features — the forum is grappling with today.

The fact is, more than 95% of the ATM applications that will run in the 20th century are already written. They're the business-critical LAN-based applications we're running already, and getting these applications to run under ATM is absolutely critical to ATM's success.

There are two basic ways an application already written for LANs can be made to run on ATM.

First, the application can be mapped to ATM at the protocol level, with special LAN driver software controlling the ATM adapter in the client system. The adapter vendor provides the LAN emulation client software.

Second, applications can be connected directly to ATM, rather than through a LAN protocol, via middleware such as the WinSock driver in Microsoft Corp.'s Windows.

How this software will be developed is still unknown.

Protocol mapping

Protocol mapping of LAN applications is what the ATM Forum approved with its Version 1 ATM LAN Emulation (LANE) standard released last fall. LANE operates at the Open Systems Interconnection media access control (MAC) layer (Level 2) and will be used primarily for work-group ATM networking.

For enterprise networking, two forum

Getting applications for ATM



The ATM Forum wrestles with the tough issues of how to support new and existing applications in an ATM world.

activities focus on emulation at Level 3. Because this is where routing takes place, both of these standards will change the role of routers in our networks.

The first option is the Multiprotocol Over ATM (MPOA) standard which is

now being defined by the forum. Cisco Systems, Inc. and Newbridge Networks, Inc. are probably the most conspicuous supporters of MPOA.

With MPOA, current LAN protocols are mapped to ATM addresses by a route

server. The route server is a kind of directory server that knows the ATM address of ATM stations running LAN applications or the ATM contact point closest to legacy LAN stations.

The other Level 3 option is the Inte-

Where ATM standards stand

By Jodi Cohen

It may still be winter, but things are really starting to heat up for the ATM Forum.

During bimonthly meetings aimed at keeping Asynchronous Transfer Mode interoperability standards on track, working groups made progress over the past few months finalizing key ATM specifications. The forum agreed on how switches will communicate in a private ATM net and completed a standard flow control scheme that allows connections to expand and contract as application needs dictate.

The forum also moved ahead on a standard specifying how servers will communicate over ATM networks and cleared up confusion about the role of Multiprotocol over ATM (MPOA) as it relates to LAN Emulation (LANE).

P-NNI progress

Perhaps one of the biggest areas of progress since the last Interoperability Report (NW, July 31, 1995) was the completion of the Private Network-to-Network Interface (P-NNI) specification.

After nearly two years, the forum finally reached closure on P-NNI, which is the protocol for routing calls between

ATM switches. Mike Goguen, chairman of the P-NNI working group, said the specification was delayed largely because of its reliance on work being done in other ATM Forum working groups.

The stickiest issues centered on supporting the available bit rate (ABR) flow control scheme and the quality of service parameters outlined by the traffic management group.

Once those issues were settled, Goguen said the group decided to identify subsets of the P-NNI standard to increase the initial chances of interoperability.

"We finally recognized the reality that vendors are not going to want to bite off the whole 400-page spec in all its full-blown worldwide ATM glory,"

Goguen said. "Instead, vendors are going to try to look for pieces that make sense to support for their customers' environments."

To ensure that all the vendors speak the same language, the group agreed on a standard that permits vendors to support only the first level of the specification to start off with. Vendors will not need the entire specification — which offers 114 levels of hierarchy — until their customers start building very large networks, Goguen said.

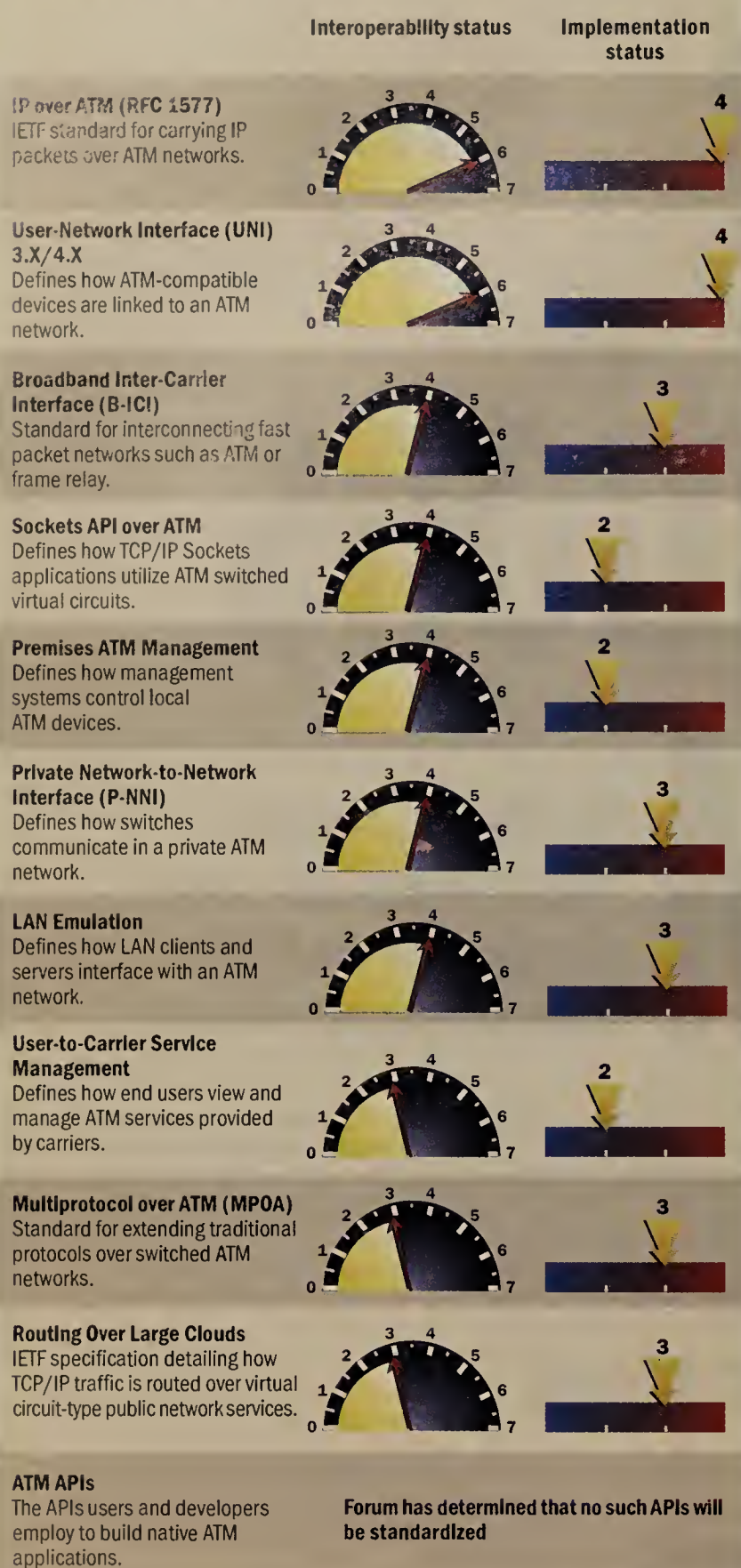
With the P-NNI standard out for final ballot, Goguen's

See ATM standards, page 59



Chairman of the P-NNI working group Mike Goguen

How key ATM standards are taking shape



KEY



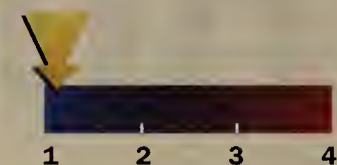
ATM Interoperability status

This scale reports the development status of key ATM interoperability standards. Support for these features is a key consideration in buying ATM products and services.

- 0 No standard defined, and no clear mandate to create a standard has been accepted by any organization.
- 1 There is a consensus on requirements and a body acknowledged as a credible source of standards.
- 2 A standard is being developed.
- 3 There is a draft standard available.
- 4 There is an approved standard available and reference implementations for review.
- 5 There are conformance tests established, and at least one agency to administer them has been defined.
- 6 Multivendor interoperability has been demonstrated based on structured and approved tests.
- 7 Product certification is available to users from at least one source.

ATM implementation status

This scale measures key ATM standards based on how widely they are implemented in products.



- 1 No products available/no vendor commitments.
- 2 Some vendors committed to supporting standard.
- 3 Some products available.
- 4 Many products available.

headers, so it's relatively easy to get ATM stations to interwork with legacy LAN stations; just pull off the ATM headers on the LAN message and what's left is what would be sent on a LAN.

Downsides

Critics of the protocol-mapping schemes point out that they don't make full use of ATM's quality of service (QoS) control features, which ensure that application traffic is given the priority it warrants. The default QoS for LANE, for example, is the unspecified class of service, which essentially means no service guarantees at all.

But this is a somewhat unfair criticism because current LAN applications don't specify any QoS and it's not clear what service any protocol-mapping strategy could select without a specific application request.

Some advances in the LAN application area could make it easier for developers to specify service quality. The Resource Reservation Protocol (RSVP),

for example, would allow an application to request a specific service quality. If LANE client software or clients for MPOA or I-PNNI were to intercept RSVP requests, they could set up an ATM switched virtual circuit (SVC) with the requested service level.

If QoS issues can be solved, what about the interoperability of the various protocol-mapped strategies?

Customers should be comforted to know that routers equipped with LANE, MPOA or I-PNNI will be able to interconnect each of these domains, just as they can connect Ethernet and token ring today. ATM differences aren't going to create disconnected islands.

The forum is also attempting to deal directly with the problem of interworking among the various protocol-mapped LAN strategies. The LANE and MPOA working groups have agreed on a set of changes to LANE 2.0, now under development, that would make LANE a subset of MPOA.

In simple terms, LANE would be used for the bridge-like applications of MPOA, connections within a subnetwork, and MPOA protocols and interactions for connections outside the subnetwork.

I-PNNI could be simpler or more complex, depending on exactly how far the concept is taken by the forum. MPOA could actually use I-PNNI to carry legacy protocol addressing and routing information across the ATM network between route servers. On the other hand, I-PNNI could transport that information all the way to any ATM destination, even to a desktop.

With the P-NNI routing standard complete, the working group can now take up I-PNNI and resolve questions on its scope and interoperability with the other two protocol-mapping standards.

One world

Some users are concerned that the multiplicity of protocol-mapping standards will deter interoperability. It is true that an ATM world with only one protocol-mapping approach would be simpler, just as a U.S. with only one make and model of car would make auto repairs easier. The sacrifice customers would make in both cases would be the ability to select products that meet specific requirements with minimal compromise.

Multiple standards does not necessarily mean too many standards. In fact, the forum shouldn't be making a final choice on behalf of customers

that have just started exploring ATM and can't provide any input. Three well-designed protocol-mapping strategies are better than one. Let the buyer decide.

APIs and ATM

The second approach to the problem of running LAN applications on ATM takes into account that nearly all communications APIs are transport APIs operating at Level 4. The Sockets API for TCP/IP, for example, operates at the TCP level, above both the data link (MAC) or network (IP) layers.

If the transport APIs now used in applications were to be mapped by software directly to ATM call setup — rather than to connectionless Level 2 or 3 messages — QoS data from the application could be used to set the ATM service type, such as available bit rate or variable bit rate service.

Given that benefit, we could toss the whole concept of LANE, MPOA, etc., right? In fact, there are challenges with API mapping, some of which could create interoperability concerns.

The first problem with API mapping is that there is a lot more going on in a Sockets API, for example, than a simple connection-oriented stream service. Sockets, like some other APIs, offers both connection-oriented and connectionless (datagram) service. It's easy to see how the former could be mapped to an ATM SVC, but how do we do connectionless ATM?

Few ATM networks provide connectionless services, and adding a server to do that invents the broadcast and unknown server of ATM LANE.

Then there's the problem of addressing. TCP/IP networks contain a domain name server that converts the Sockets logical name to an IP address. In any form of LAN emulation, that server would still exist for TCP/IP users, and it would still be the same TCP/IP product it always was.

But what would the domain name server be in a Sockets-to-ATM network?

Finally, classical data APIs such as Sockets have a problem supporting isochronous ATM connections — so-called ATM Class A services needed for applications such as video. Programs read and write data in little arbitrary chunks, and variations in task switching among operating systems as well as other system factors can radically influence the throughput of such a read/write process. That means that video or voice connections

grated Private Network-to-Network Interface (I-PNNI), which is most visibly supported by Bay Networks, Inc. and IBM.

With I-PNNI, ATM's own routing protocol is used to carry topology and addressing information about legacy LAN and ATM-emulated LAN stations over the ATM network. At the ATM network boundary, that information is used to build routing messages in traditional Level 3 protocols such as Routing Information Protocol or Open Shortest Path First.

Protocol mapping to ATM means intercepting an application-to-LAN connection after some number of LAN protocol layers have already been created by client or server software.

For example, LANE operates at the MAC layer and emulates services to any LAN application. MPOA, providing services at both OSI Level 2 and 3, would emulate the features of protocols such as IP.

The value of protocol mapping is that it can typically be used with existing applications. You simply replace a network interface card driver or similar software with software that is ATM-aware and supports the protocol-mapping standard being used. No recompilation of source code is necessary, and no application changes are mandated.

Protocol mapping also preserves the entire application protocol stack, including its

might lose synchronization through excessive program handling delay.

Making an isochronous connection through a system isn't new — telephone APIs do it all the time. A call-handling PC using a computer telephony interface such as Telephony API (TAPI) or Telephony Services API (TSAPI) doesn't shuffle voice one syllable at a time. It commands a connection and the information flows through a channel that doesn't include the program.

Future ATM video connections will surely link the ATM adapter to a video adapter or camera digitizer and compression card without passing through a program, possibly even bypassing the desktop computer's system bus. A new consortium called 120 has been formed to create an I/O standard that would facilitate, among other things, the building of these shunt interfaces in a hardware- and operating system-independent way.

Click over to Network World Fusion for copies of draft specifications mentioned here. Select NetRef, Technology Resources then ATM.



It's logical to assume that the APIs going hand in hand with I/O standard development will be derived from the TAPI and TSAPI standards, just as Win-Sock Version 2 is derived from the original TCP/IP sockets interface. But it's undesirable to assume anything; a firm industry position would be helpful, and that probably won't come until more desktop ATM is deployed.

The reason market consensus may be required to pick a video API is that no single agency is chartered to standardize one. The ATM Forum's Service Aspects and Applications workgroup's API subgroup has reluctantly decided that it cannot publish an API since it doesn't have jurisdiction over the current ones.

Apple Computer, Inc., IBM, Novell, Inc., Microsoft Corp. and X/Open Company, Ltd. all have APIs, and each would have to answer questions of addressing and mapping API services to ATM services independently.

In fact, a number of vendors that provide adapters and network software might take it on themselves to answer the questions in their own way, standards or API ownership be hanged. If this were to happen, application development would be fragmented among the APIs and users would, at least for a time, have fewer application choices for any given ATM equipment set.

Another bump

There's also an interoperability issue inherent in the way that an API sets up an ATM connection.

LAN emulation standards such as LANE describe the ATM connection pro-

cess very carefully, and standards-based implementations will all follow the same procedure.

With API-mapped ATM, middleware on each system will set up the ATM calls, and there is no assurance that vendors will decide to do this the same way. Thus, two Sockets users might not interwork over ATM even if both had API-to-ATM middleware.

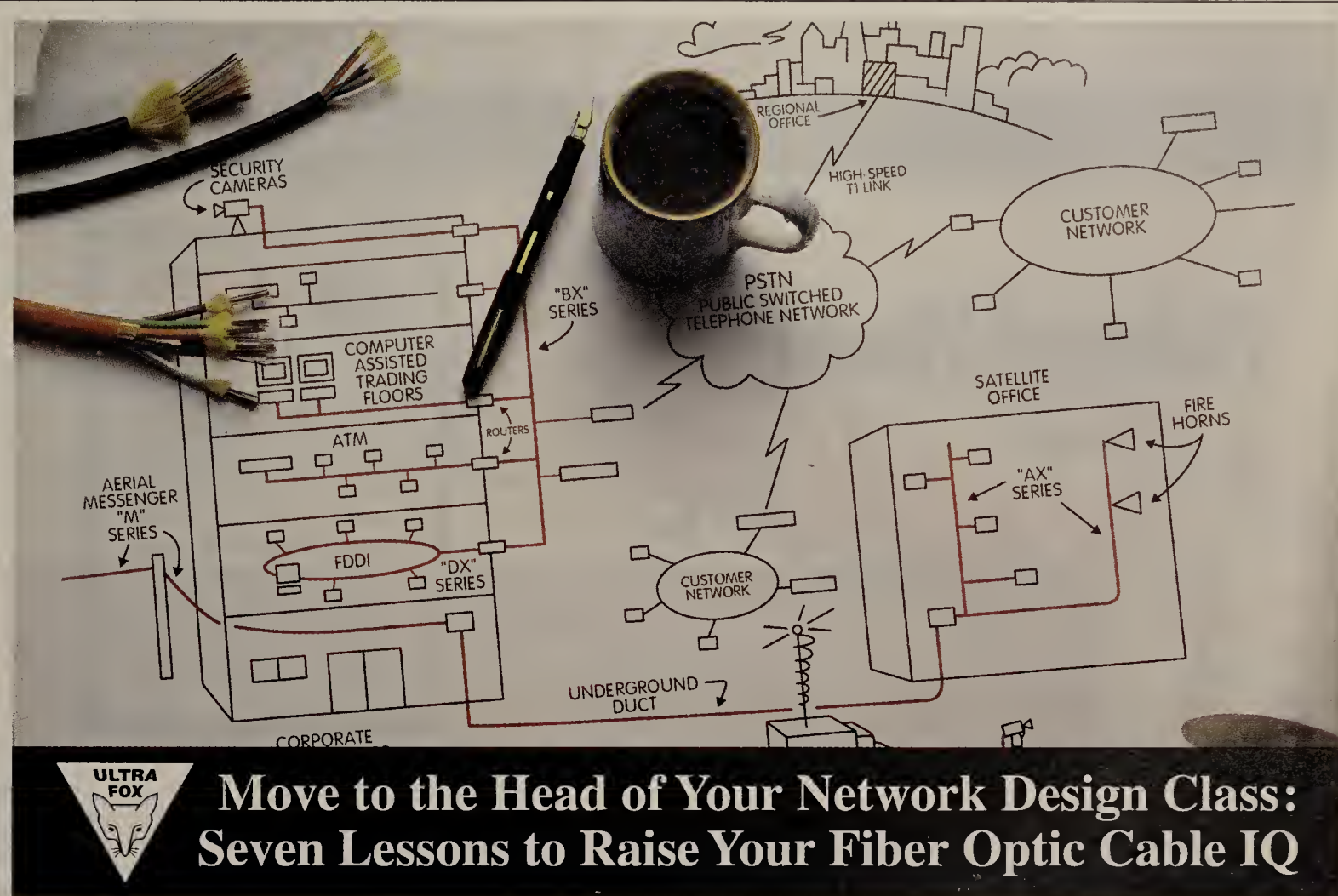
To minimize or prevent this problem,

the Service Aspects and Applications working group has developed an ATM semantic—a description of the ATM connection process to be used as the basis for ATM middleware or APIs that directly support ATM calling and information transport.

The plan is that all ATM APIs would conform to this semantic and thus be assured of interoperability—at least at the ATM call—setup level.

The ATM specifics

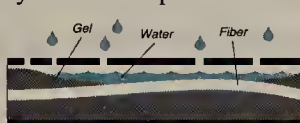
Just as there has been concern expressed about the multiplicity of protocol-mapping strategies, there has been criticism about the forum's decision on ATM-specific APIs. The fact is that these APIs would contribute little to ATM in this century. How many developers would write to an API set that could be run on less than a half-percent of all desktops? How many would convert, at possibly con-



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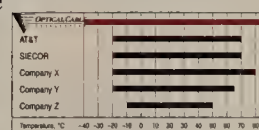
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siderable expense, existing applications to ATM?

Exploiting today's APIs through middleware is the answer to ATM's API problem, combined with some thoughtful expansion of current APIs to permit QoS to be specified by the user. With these features, we can be assured of a rich variety of ATM applications linked to the network where user applications should really be linked—at Level 4.

But even reconciliation of the protocol-mapped strategies and acceptance of ATM middleware for API mapping won't solve all the problems.

There's still the question of how API-mapped ATM users will interwork with protocol-mapped ATM users or with native LAN users.

Native LAN users and protocol-mapped users will require messages with Level 2 and 3 headers. Imagine a connec-

tion between a Sockets API ATM application and a TCP/IP-attached workstation. Does the ATM application stick an IP header on its message, even though an ATM SVC creates a virtual pipe from source to destination, so IP routing wouldn't be required? If not, how does the real TCP/IP station get that header?

The forum may try to address questions like this, but its authority to do so is limited, as the group itself acknowledges.

Organizations such as X/Open, the Internet Engineering Task Force and the vendors that own proprietary APIs will have to resolve these issues for their own environments.

Which approach is best?

The best strategy for running existing applications over ATM will depend on the specific way your company evolves to ATM. That, in turn, will indicate which standards you should watch most closely.

If you have aggressive ATM application plans and you intend to convert most or all your desktops to ATM in the next two to three years, you should probably follow the ATM API debates and standards closely. If you are a Windows user, Microsoft's home page is a good place to start tracking WinSock Version 2. Unix users should follow the X/Open activity with the X/Sockets or X/TLI APIs.

If you expect ATM to start at the desktop in selected workgroups only and build gradually into an enterprise commitment, you'll probably use LANE first and later migrate to MPOA or IPNNI. For you, the compatibility between LANE and these higher layer standards may be the critical issue. That's resolved for MPOA now, but watch the progress on the reconciliation of LANE and IPNNI.

If you are moving to ATM based on carrier service availability or backbone congestion, you may be a near-term consumer of a Level 3 protocol-mapping strategy.

Right now, there is no draft standard for either MPOA or IPNNI, so you'll have to contact vendors that endorse one or the other (for example, Cisco or Newbridge for MPOA, Bay for IPNNI or Fore Systems, Inc. for either) and get a good grounding in the approaches being taken.

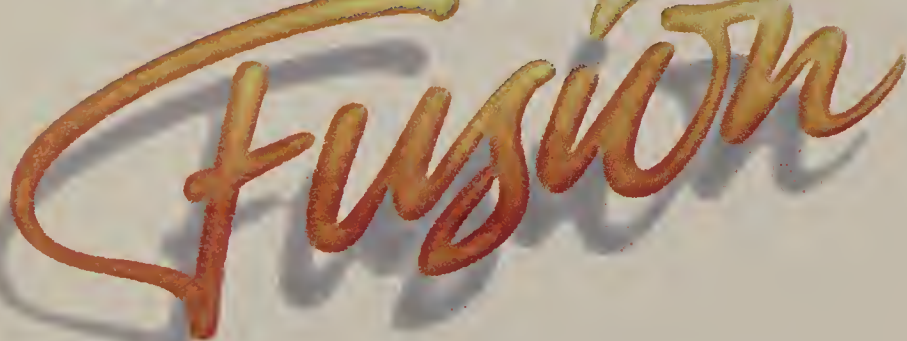
Whatever your course of evolution, keep standards in perspective. Less than a quarter of today's traffic is carried by standards-based protocol stacks, even by the most forgiving definition of standards-based. Most users don't set out to buy multivendor networks, and in the early stages of ATM deployment, the factors that would lead users into multivendor commitments haven't had time to take hold.

Good price/performance and feature benefits in the near term may be more important than strict standards conformance as long as the vendor has a gateway option to ensure interworking. The most standards-intensive network is useless if you can't get it justified.

Nolle is president of CIMI Corp., a technology assessment firm located in Voorhees, N.J. He can be reached at (609) 753-0004 or via the Internet at tnolle@ix.netcom.com.

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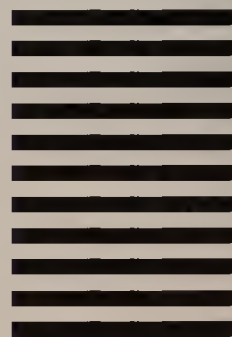


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Encryption for the Enterprise

Nortel's Entrust makes security painless.

By Stephen Cobb

The confidentiality, integrity and availability of your on-line information have never been more at risk. Fortunately, one effect of the Internet's recent rise to stardom has been an upsurge of network security awareness. Northern Telecom, Inc.'s Entrust packages are part of a rapidly expanding category of products that offer

effective solutions to some of the more challenging security problems.

Entrust promises a full range of high-speed encryption, authentication and verification services in a single application that's relatively easy to install and administer. We reviewed the workgroup version, Entrust/Lite, and found it goes a long way toward delivering on that promise. In addition to robust security, Entrust offers smooth integration with word processing and messaging applications, two areas where encryption can be most valuable.

Entrust yields fast, strong encryption of files using either the Data Encryption Standard (DES) or the proprietary CAST algorithm. (CAST stands for Carlisle Adams and Stafford Tavares, the algorithm's inventors.) In addition, Entrust provides digital signing of files through public key encryption, to verify the files' source and integrity when they reach their destination. This protects against source spoofing and modification of data in transit.

Furthermore, through the use of recipient lists, Entrust ensures that encrypted information can be decrypted only by the person intended to get it. And all of this is done without users having to choose or communicate passwords, which is typically a weak point in encryption schemes.

Entrust/Lite 2.0 handles workgroups of up to about 100 users for as little as \$50 per user — relatively inexpensive for a commercially supported product offering this level of cryptographic strength and functionality. For larger scale networks, the full version of Entrust, which

uses X.500 directory services to provide enterprisewide encryption key management, varies in price according to the number of users. However, the client component of Entrust is exactly the same as the full-size version, and the versions are completely compatible.

Entrust represents significant progress toward simplifying the often complex problems of managing encryption. It automatically manages the keys to encrypted documents while using powerful encryption mechanisms.

For example, suppose you've written a competitive market analysis in Microsoft Corp.'s Word and want to password-protect it before making it available to a group of colleagues. If you use the password protection built into Word, you have to figure out a secure way of telling your associates what the password is, and you expose the document to tampering or dis-

NetResults

Product
Entrust

Vendor
Northern Telecom, Inc.
(919) 992-5525

Price
\$50-\$125 per user; site licenses available.

- Pros**
- ▲ Easy to install.
 - ▲ Fast, strong encryption; file verification
 - ▲ Automatic key management
 - ▲ Can be scaled up from workgroups to a large number of users

- Cons**
- ▼ Does not encrypt E-mail messages
 - ▼ Not completely automated
 - ▼ International deployment may be hampered by U.S. export restrictions

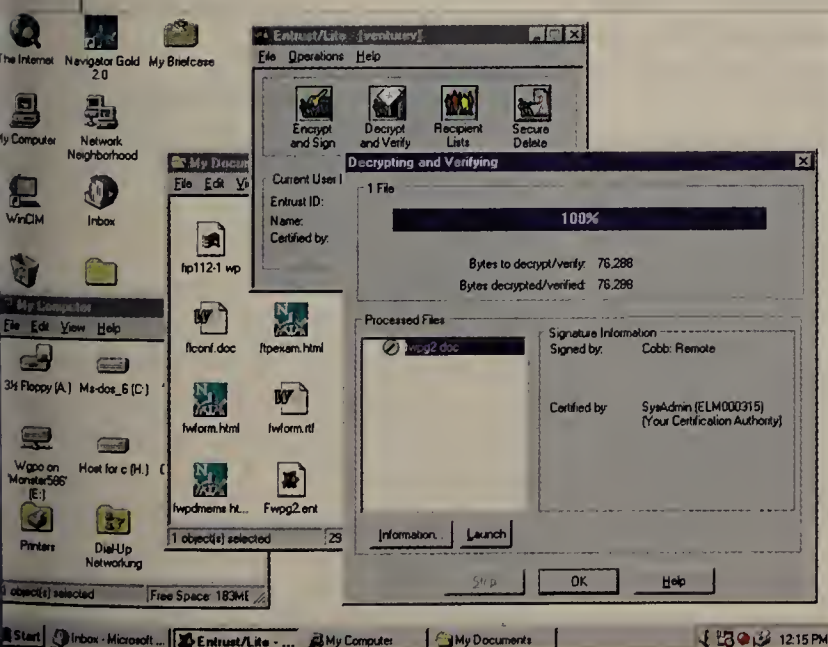


Figure 1: You can decrypt files in the 32-bit version of Entrust by dragging them to the Decrypt and Verify icon.

closure by anyone who can use one of the many Word password-cracker programs available on the Internet.

If you use Entrust, there is no need to choose, transmit or remember document passwords: this is taken care of by Entrust, which also verifies that the contents have

arrived unchanged — in the unlikely event that someone has broken the powerful encryption code applied by Entrust. The technology that makes this possible is complex (see story, this page). However, Nortel has done a good job of making the Entrust interface a model of simplicity.

Installation

Entrust consists of separate Manager and Client modules available for Windows 3.X, 95 and NT, MacOS and major commercial Unix variants. The Manager is used to establish and administer user accounts. Access to this module should be limited to the security or network administrator, who holds the power to decrypt anything encrypted by any user. This is an important backdoor for organizations con-

cerned about abuse of encryption. It prevents rogue employees from attempting to ransom data.

Despite the terminology, you do not have to install the Manager on a network server; in fact, you don't have to be connected to a network to deploy Entrust. You can send secure documents between offices on disk or via dial-up electronic mail. This gives you considerable flexibility when dealing with notebook machines. The manuals accurately describe how to make the most of both network and off-line installations.

When you install the Manager module, you assign a master password. This has to be at least eight characters, including at least one digit, one capital letter and one special character. That means there are roughly 8 possible combinations, or thousands of centuries' worth of cracking attack time, even at one million attempts per second.

The Client module is used to encrypt and sign files. The Client also manages recipient lists, consisting of other Entrust users with whom you want to exchange information.

A security administrator uses the Manager to set up each Client user, assigning names and creating small packets of documentation that include an initial password. The manual does a good job of leading you through this process, although if Nortel really wanted to spoil us, it would have included templates for the end-user documentation described in the manual. We particularly liked being able to display our own custom bitmap banner automatically every time a user loaded the Client module. You might use this feature to display a corporate logo or refer to corporate security policy.

Client installation is straightforward. You have the chance to select support for E-mail — although your choice is limited to Microsoft Mail or Lotus cc:Mail — plus macro support for Word 6.0 that lets you save and open files directly in encrypted format. Once the Client packages are in place, users have control over several important options, starting with the ability to change the password that gives them access to the Client module.

User-selected account passwords are, potentially, the weak link in this encryption scheme because someone who discovers your account password can decrypt files. Entrust offers two defenses. First, the password provisions are very tough — with a three-tries-and-you're-out defense against brute-force attacks.

Second, Entrust allows the equivalent of a removable token, without which your account cannot be accessed. This is actually the file containing the user profile, which can be stored on a floppy disk instead of the hard drive, turning the disk into a portable token.

Another nice touch is the time-out provision, which logs you out of the Client program after a user-specified time

period of inactivity, defending against abuse of an unattended machine.

The Client module allows users to employ Entrust's encrypting and signing services in a variety of ways. Microsoft Word documents can be saved into encrypted format direct from the File menu in Word. A .ENT extension is used to distinguish these files, which can also be decrypted with the special Open command that Entrust's macros place on Word's File menu.

When you configure Entrust Client to work with cc:Mail or Microsoft Mail, you can encrypt and transmit files as E-mail attachments from within the Entrust Client. A file appears as an icon in the message when it is viewed by the recipient. Double-clicking on the icon calls up the decryption dialog box, which includes a handy Launch button to load the decoded document directly into the application. This feature is convenient, but, as the dialog boxes warn, the E-mail messages themselves are not encrypted, just the attached files.

Also, Entrust requires identical naming conventions for users of both Entrust and the E-mail package. This may sound like a reasonable requirement, but it could involve a lot of effort for larger workgroups. A system for mapping E-mail names to Entrust Client names would be a nice enhancement.

Other types of data can be encrypted, signed, decrypted, verified or erased securely by using the menus and file selection dialog box in the Client module, or by dragging and dropping files onto buttons that the Client module displays. We encountered no problems transmitting a variety of signed and encrypted files around our LAN.

The speed with which Entrust encrypts is quite impressive. Our 972,938-byte Word document took 18 seconds to sign, encrypt and compress on a Compaq 486SX workstation using Nortel's CAST algorithm and 20 seconds using DES. The resulting file was about 94,800 bytes. By comparison, it took PKzip 24 seconds to

See Review on next page

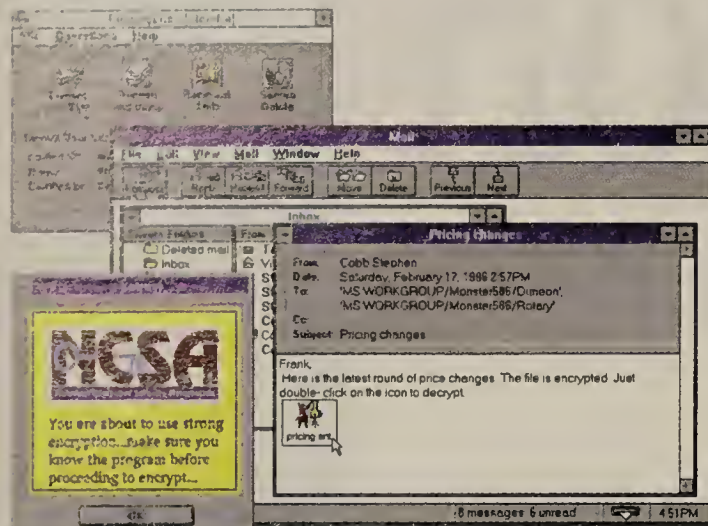


Figure 2: After E-mailing Entrust-encrypted files, you can double-click on the icon in the message to decrypt.

Restriction vs. encryption

To restrict access to information, you can either stop unauthorized people from getting near it (meaning restricting access to the area in which the information is stored), or render it meaningless even if they do get to it (scramble or encrypt the information). Both approaches have merit and many organizations employ both, in a layered approach.

Restricted access methods work best when data is at rest. But today's data is highly mobile, traveling across global networks, many segments of which are untrusted. To handle data on-the-fly, the natural solution is encryption, for which most organizations must pay a price in both cost and complexity.

Entrust is one of a range of products that use public key encryption. In cryptography, a key is a numerical value used to protect data, much like a password.

Suppose you wish to securely transfer a document to your boss. You start up the Entrust/Client application to sign and encrypt the document, and select Boss as the intended recipient. Entrust uses your signing private key to create a digital signature for the document. A digital signature is analogous to a paper signature, except it is fully electronic and harder to forge. A digital signature is computed on a mathematical fingerprint of the document, which is known as a hash result or message digest.

After signing the document, Entrust creates a disposable, single-use symmetric key to encrypt the document. Then Entrust encrypts that symmetric key with Boss' encryption public key. Since Boss' public key is used to encrypt the symmetric key, only Boss will be able to access the symmetric key through his decryption private key.

Once the document is encrypted, you send the signed and encrypted document over the network to Boss. When the document arrives at his workstation, Boss uses Entrust to decrypt the document. Entrust automatically employs Boss' private key to decrypt the symmetric key, which is then used to decrypt the document. To verify that the document was sent by you, Entrust uses your verification public key and a freshly calculated hash result to verify the digital signature. Entrust confirms to Boss that the signature is authentic and that the document has not been altered since you sent it.

Public key cryptography removes the need to use the same key for encryption and decryption. The two different keys, neither of which can be derived from the other, are mathematically generated. You reveal one, the public key, to anyone who wants to send you an encrypted message. You keep the other private key to yourself.

Three mathematicians — Rivest, Shamir and Adleman — came up with an algorithm that makes this possible, based on the difficulty of deducing from a large number (100 digits or more in length) the two prime numbers that were multiplied together to make that number. They eventually formed RSA Data Security, Inc., one of today's leading encryption vendors.

Public key cryptography facilitates key management by greatly reducing the need for on-line trusted key servers and by simplifying key distribution protocols. Furthermore, public key cryptography can provide digital signatures, which guarantee message origin and integrity. They also provide nonrepudiation, an important defense against participants in an electronic transaction later denying their involvement, by asserting, for example, "I never placed that order."



HOW WE DID IT

We installed Entrust/Lite on a variety of machines, including a Compaq Computer Corp. Concerto 486SX25, a Digital Equipment Corp. Venturis Pentium 90, and two other PCs with 100-MHz Cyrix 586 and 33-MHz AMD 386SX CPUs, running both Windows for Workgroups and Windows 95. We then transmitted a variety of signed and encrypted files around both NetWare and Windows for Workgroups LANs, using Microsoft Mail and file transfer. We also encrypted a 972,938-byte Microsoft Word file to see how fast Entrust performed.

ATM standards

Continued from page 53

group can now turn its attention toward the Integrated-PNNI (I-PNNI) protocol mapping scheme. I-PNNI, which builds on P-NNI, is ATM's own routing protocol for carrying information about legacy LAN devices over an ATM network.

ABR action

Big strides were also made by the traffic management group, which just finalized the ABR flow control scheme. One of the most important ATM quality of service specifications, ABR uses available bandwidth for data transmission rather than reserved bandwidth.

ABR uses bandwidth left over after some has been reserved for constant bit rate (CBR) and variable bit rate (VBR) traffic. That means the share of ABR bandwidth varies depending on CBR and VBR application needs.

Two modes of ABR service were standardized: Explicit Forward Congestion Identification (EFCI), which allows switches to set a congestion indication bit in cell headers; and Explicit Rate (ER), which allows switches to indicate within cells exactly which rate they are willing to receive along a particular connection.

The document has been sent for final ballot and should be approved in April.

In other ATM Forum news, a new version of the LANE specification is in the

works. LANE defines how applications for traditional LANs can run over ATM.

The new LANE 2.0 specification will allow multiple LAN Emulation servers (LES) to communicate. LANE 1.0 standardized the interface between clients and servers, said Keith McCloghrie, chairman of the LANE working group.

"[LANE 2.0] will make the network more scalable, robust and redundant," he said. "For example, if one of the serv-

ers goes down you wouldn't lose the whole emulated LAN; you would only lose the clients that were talking to that server."

McCloghrie expects LANE 2.0 to be finalized by year-end.

Finally, the LANE and MPOA groups have agreed on the relationship between the two protocol mapping strategies. Since MPOA is a specification for routed LAN Emulation, it operates at both Level

2 and Level 3 of the Open Systems Interconnection model. So the working groups have decided that when a device supporting MPOA runs at Level 2, the device will use the LANE standard.

"This should put an end to the confusion as to what happens to LANE when MPOA comes along," said George Swallow, chair of the MPOA working group.

The MPOA group hopes to finalize the specification by next February. ■

Review

Continued from previous page

perform standard compression of the same file at the DOS prompt, without password protection, but PKzip squeezed the file to 69,825 bytes. In fast mode, PKzip took only 6 seconds but compressed the file to only 113,362 bytes.

Entrust's documentation is excellent, and installation, while not trivial, is as easy as anything we have seen in an encryption product.

There's a lot Entrust does not do. It does not encrypt E-mail messages, perform automatic encryption of documents on the fly at the operating system level, or create a special partition in which all documents are transparently encrypted; you have to invoke Entrust for specific files.

But the speed and strength of Entrust's encryption, together with the automatic handling of key management and document verification, make it both easy and powerful enough to get a high level of security practical for any organization.

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 43.



Cobb is director of special projects for the National Computer Security Association. He can be reached at scobb@ncsa.com.



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Briefs

■ **LearningTree International** has developed eight new Microsoft Corp. Windows training courses.

Each class runs for four days and offers hands-on training in various locations across the country. The new classes are TCP/IP Internetworking on Windows NT; NetWare-to-Windows NT Migration; Microsoft Systems Management Server; Introduction to Microsoft SQL Server 6; System Administration for Microsoft SQL Server 6; Advanced Windows Programming with Microsoft Foundation Classes; Windows Open Services Architecture; and Visual Basic 4 for Enterprise Applications.

Learning Tree: (800) 843-8733.

■ **Gemini Consulting** has named Jim Noble as vice president of its Information Management Discipline division.

Noble was formerly chief information officer at Trafalgar House plc in Great Britain. He was instrumental in developing knowledge management and virtual corporation programs for the \$7 billion conglomerate. Noble will bring his process redesign know-how to Gemini's Business Transformation service.

Gemini: (201) 285-9000.

■ **The National Automated Clearing House Association (NACHA)** and the **Independent Bankers Association of America** will conduct an **Executive Electronic Banking Seminar** in five locations across the country.

The seminar will include topics ranging from an explanation of the technologies used for electronic banking to hints community bankers can use to create electronic banking programs.

The seminar will be held April 4-5 in Dallas; May 20-21 in Nashville; Sept. 16-17 in Minneapolis; Oct. 7-8 in Kansas City, Mo.; and Oct. 31-Nov. 1 in Scottsdale, Ariz.

NACHA: (703) 742-9190.

Texaco gets higher octane from outsourcing deal

By Elisabeth Horwitt

When Houston-based Texaco, Inc. last year outsourced its distributed computing support and help desk department to IBM's Integrated Systems Solutions Corp. (ISSC), it wasn't about to blindly turn over complete control just to save money. Rather, the energy giant wanted to create a tight partnership that would not only allow it to look over ISSC's shoulder, but also to get the outsourcer involved in setting Texaco's strategic direction.

To achieve this goal, Texaco designed a management structure that enables it to track con-

"Our business units pay the freight, and they understand business strategies," says Rick Deans, Texaco's director of distributed computing management. "We have to make sure IT strategies match up with that, so we feed business information to ISSC and ISSC comes up with suggestions on how to meet those goals."

ISSC has done its part in building effective communication with Texaco. For example, it has developed a relationship team that emulates the structure of Texaco, says Frank Lusk, a client solutions executive at ISSC. "We have someone with responsibility for each business unit who acts on its behalf, anticipates its needs and requirements." This approach enables the ISSC staffer to become involved in planning infrastructure changes that will impact a given unit, Lusk says.

ISSC's relationship team is separate from the people who actually deliver the support and help desk services that keep the 13,000 workstations in Texaco's domestic operation humming. The support and help desk services team has an open channel back to Texaco and is kept apprised of whom to contact when facing a problem it can't resolve.

There are still handoffs from ISSC to internal IT specialists, Deans says. "It makes no sense for ISSC to learn how to support special financial reporting software since we already have people who know it."

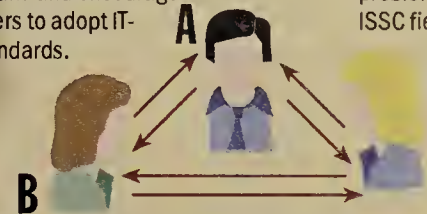
Cooperation is key

This type of interactive partnership is crucial to the success of an outsourcing venture, particularly one that involves a mission-critical and highly visible area such as help desk management and support, says Allie Young, a senior analyst at Dataquest, Inc.

Companies that outsource realize the need for such a partnership. In a Dataquest survey of 149 sites published last summer, 74.5% of respondents expected an outsourcing vendor to act as a

Communication flows three ways

Texaco's Information Planning Group — Speaks with ISSC to ensure contract terms are met, negotiate contract changes, share current and changing IT strategies and explain business unit needs. The group also talks with business unit managers to formulate strategic plans and encourage the managers to adopt IT-backed standards.



Texaco business units — Provide input to the Information Planning Group on changing computing needs and reaction to support and help desk service. The units also report problems to ISSC and comment on ISSC's proposed technology changes.

ISSC — Funnels up to Texaco suggestions for ways to better serve users, data on current computing service levels and help desk activities (such as frequency and type-of-problem reports) and problems requiring IT intervention. ISSC fields front-line support and help desk calls from business units and passes along to those units ideas on how to improve technology use.

strategic business partner. Only 3.4% said they prefer to turn over full management responsibility to the outsourcing vendor.

Developing support

Even with communication lines open, Texaco's IT department, end users and outsourcer have not yet established perfect rapport. "Communications has still turned out to be our Achilles' heel on a lot of issues," Deans says.

For example, some time ago, Texaco IT planners adopted a strategy of standardizing desktop configurations to lower support costs. The company figured the fewer differences among PC configurations, the less time it would take to perform tasks such as software upgrades and disk backups.

Furthermore, a poorly configured PC or bandwidth-hogging application could wreak serious havoc on an office LAN, Deans says.

Helping Texaco move closer to standardization was in ISSC's original job description. However, Deans says, it would be presumptuous of him and ISSC to tell end users how to configure their desktops. "Individual business unit management handles discipline and the drive toward standards," he says.

What IT can do, with ISSC's help, is provide business unit management with information to support its move toward standardization, Deans says. For example, ISSC uses sophisti-

cated tools to monitor changes that users make to their desktops, tracking everything from installation of a new screen saver right down to changes in config.sys files.

That information, along with ISSC data about the costs associated with not being standardized, is given to business unit management.

Deans notes that a key reason open communication is such a pivotal element of an outsourcing arrangement is that the client can only keep tabs on its outsourcing company up to a point.

"I must trust them, and they know I must," Deans says. And that trust naturally depends on good communication. "They have to understand our intents, and we have to know that they understand," he says.

Horwitt is a freelance writer in Waban, Mass. She can be reached via the Internet at 75244.1666@compuserve.com.



There's more outsourcing info on Network

World Fusion (<http://www.nwfusion.com>), including Network World's outsourcing special report. You'll also find links to:

Fenwick & West, a law firm with outsourcing legal information, including tips on structuring an outsourcing deal.

The Outsourcing Institute, a professional association dedicated to educating companies on the strategic use of outsourcing. The site includes discussion groups, primers, news and an outsourcing library.

"Evaluating outsourcing's promised gains," an article by Jim Smith, general manager of NewTec Consulting, the management consulting and systems integration division of BEST Consulting in Seattle.

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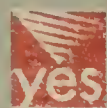
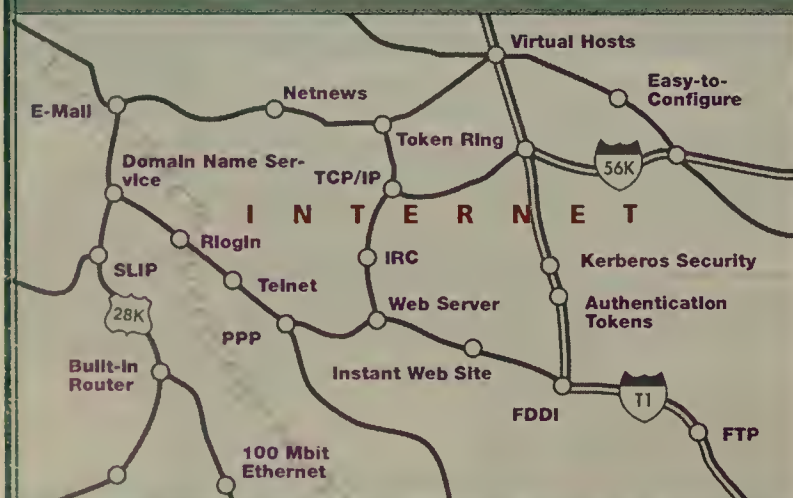
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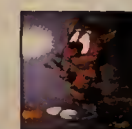
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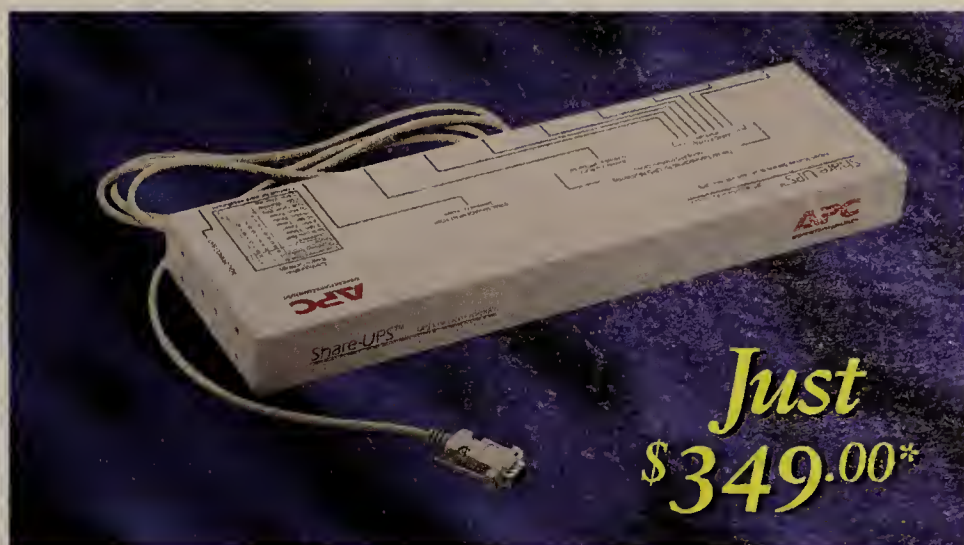


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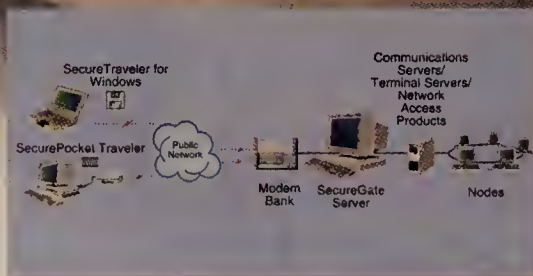
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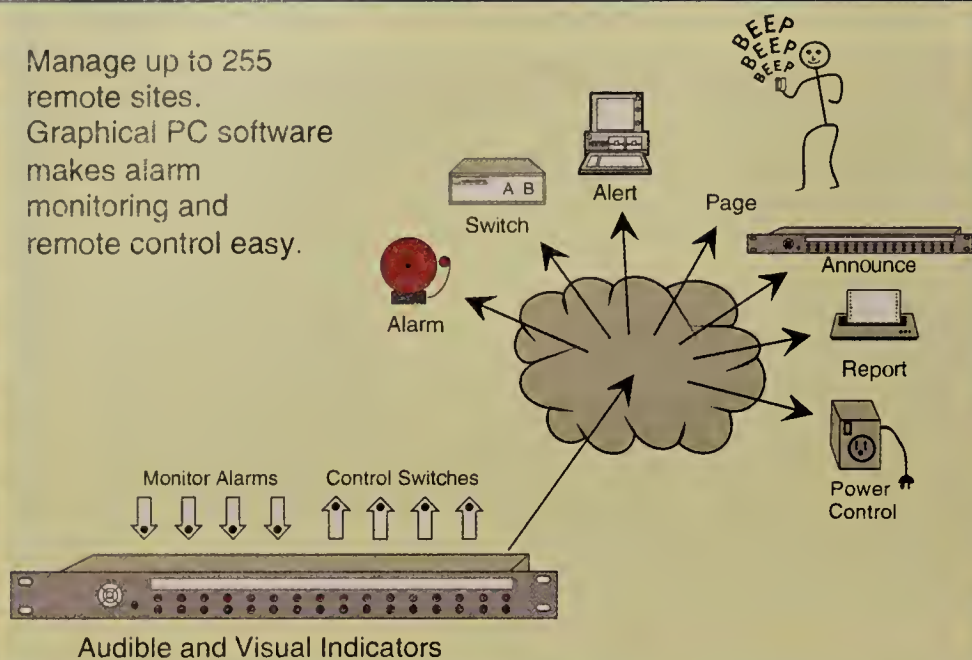
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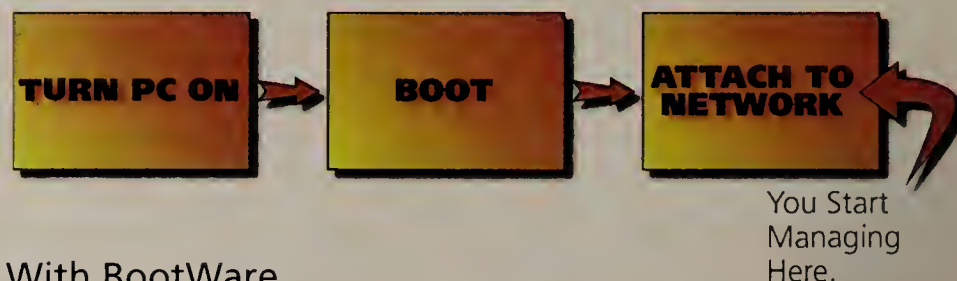
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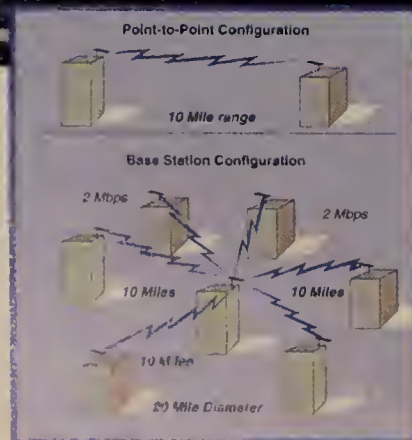
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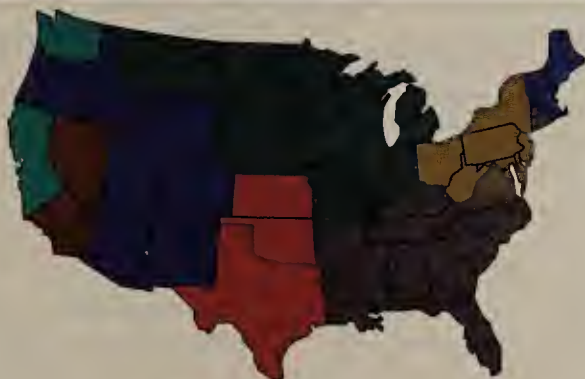
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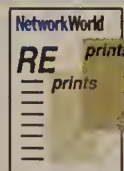
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APPN/HPR

Continued from page 1

a variety of other technologies aimed at helping IBM SNA users migrate to higher speed networks. IBM is also expected to add HPR to most of its line of communications products by the end of the month.

The moves promise users more flexibility in modernizing their SNA nets, but analysts said they may prove to be too little, too late. APPN/HPR has taken so long to come to fruition that beyond "true Blue" shops—the most loyal SNA users—the technology is unlikely to make much headway against the TCP/IP juggernaut.

"It's hard to ignore TCP/IP. Most SNA users need Internet access, and subsequently TCP/IP," said Lynn Nye, president of the NetResults, Inc. consultancy in Portland, Ore.

"Cost and the lag time for products was what drove us away from APPN," said Peter Carayannakis, a consultant with Ontario Hydro, a utility in Toronto.

HPR is an extension of IBM's next-generation SNA APPN technology that adds such features as congestion control and the ability to route traffic around

network failures.

3Com will implement HPR in Release 9.0 of its NetBuilder II router software, while Bay will deliver HPR support for its Backbone Node and Access Stack Node routers and its Access Node Hub. As expected, Cisco will add HPR to its 7000 series router (NW, Jan. 29, page 1). For its part, IBM will ultimately offer

HPR DEFINED

High Performance Routing is a third-generation SNA technology that eliminates many of the foibles of APPN, such as the inability to route around net failures. It promises a tenfold increase in net performance by reducing overhead and controlling congestion.

HPR in its 2210 router and 3172 controllers, as well as in its 3745/3746 front-end processors (FEP). IBM already supports HPR in VTAM, the 3174 controller and 6611 router.

HPR aside, 3Com is also making it easier for SNA users to connect to frame relay services by

introducing Boundary Access Node (BAN) support for NetBuilder II. BAN is one method for linking FEPs to frame relay nets. It lets multiprotocol traffic share a single frame relay Data Link Connection Identifier, saving line costs and reducing the number of systems definitions needed for FEP connectivity.

3Com also added improved Data Link Switching (DLSw) features that let users prioritize LAN and SNA traffic by address over a TCP/IP backbone. DLSw defines how SNA and NETBIOS traffic flows over a TCP/IP net.

Bay introduced its own DLSw priority scheme, called Synchronous Data Link Control Secondary, which lets users prioritize SNA traffic per SDLC link.

3Com and Bay Networks HPR and DLSw support will be available this month.

HPR may also get a boost from a specification making the rounds at the APPN Implementers Workshop that would make it the SNA access method of choice for future Asynchronous Transfer Mode nets. The document on APPN/ATM interworking describes how vendors could map HPR class-of-service routing directly to ATM's Quality of Service specifications. ■

Banyan

Continued from page 1

series of onerous hoops and legal agreements that could minimize the number of users who qualify.

First, current customers have to sign an agreement saying they accept the new pricing, declaring how many users will fall under the new pricing and agreeing not to buy products under the old model. Second, if customers find their servers lack some of the options included in the bundles, they will have to upgrade those servers to match Banyan's new server packages.

Finally, customers will have to buy a VIP subscription for every end user who falls under the plan, at \$50 per user per year. That program guarantees a customer free access to all software upgrades during the year. "That's the part that gives me the most heartburn," said John Scoggin, staff technical consultant/advanced technology for Delmarva Power and Light Co. in Newark, Del. "It sounds like a great deal for new users."

"Banyan was on the right track, but they're confusing the issue and making things more difficult for smaller shops," said Neal MacDonald, analyst at Gartner Group, Inc., a consultancy in

Stamford, Conn. "The [new plan] started out great; the whole industry is moving toward per-node pricing, so that's an improvement. In the end, this pricing will hurt them."

Banyan had planned to announce the scheme at the Association of Banyan Users International Conference here this week, but decided to get feedback before locking in details, said James Ringrose, director of corporate communications at Banyan. The plan is to offer a standard LAN server running VINES 6.0, Enterprise Networking Services (ENS) for Unix, or NT. This server will include standard Banyan options plus Symmetric Multiprocessing Support, Remote Network Management, and a network event History Collection Service.

The Extended Enterprise Server will include all Standard Server options. It adds the ability to tie in remote dial-in users, supports WAN communications protocols including ISDN, SNA, T-1, and X.25, and Token-ring Bridging. It will also

include the ENS for NetWare platform, which puts StreetTalk on NetWare networks, and lets VINES and ENS users run IPX/SPX networks.

The Standard Server package will cost \$1,495, plus \$199 per user. The Extended Enterprise Server will cost \$2,495, plus \$199 per user. ■

BANYAN'S BARGAIN BASEMENT

Banyan to test simpler price plan

Server (plus 50 clients)	Old price	New price
Standard Server*	\$18,613	\$11,445
Extended Enterprise Server**	\$41,523	\$12,445
Server options		
Outlook Management	\$1,995	
EBR Backup Server Agent	\$750	
EBR Backup Service	\$3,000	

Client options

TCP/IP Applications Suite	\$4,995 for 50 users
EBR Workstation Agent	\$4,150 for 50 users
EBR Jukebox, host connectivity and Remote LAN Server also extra	

*Includes LAN Server-to-Server, Intelligent Messaging, Remote Network Management, VINES Assistant, SNMP Server Agent, History Collection Service, Symmetric Multiprocessing Support.

**Includes Standard Server package, plus Asynchronous Terminal Emulation, WAN Server-to-Server protocols, TCP/IP Routing, TCP/IP Server-to-Server for Internet Access, ENS for NetWare (IPX option) and Token-ring Bridging.

Copyright

Continued from page 1

& Updegrave, a Boston law firm specializing in high technology and computer law (seesidebar).

But as the Internet continues its meteoric rise in popularity and visibility, and as more and more copyright holders become 'Net-savvy, copyright disputes are likely to increase dramatically. While copyright infringement can be subject to criminal penalties, Gesmer said, most cases usually are handled in civil court.

In the OLGA case, EMI alleges that the site has been using copyrighted material without a license, and if one is not acquired, the music publisher will take legal action, said OLGA archivist Cal Woods.

EMI attorney Barton Weiss declined to comment on the details of the case because "the matter is still unresolved." UNLV legal counsel David Hintzman would not return phone calls regarding OLGA.

OLGA, which evolved from several guitar newsgroups, has existed for about four years. "OLGA probably is one of the most organized guitar communities," Woods said.

Woods estimated that 5,000 to 10,000 guitarists have contributed to the site and about 200,000 songs had been downloaded per week. OLGA had become so popular that fellow enthusiasts set up numerous mirror sites around the world.

Nonetheless, the site managed to elude EMI's radar screen until October, when EMI's British division, Thorn EMI, threatened OLGA's mirror site in the U.K. But it wasn't until four months later that EMI's New York office moved on OLGA's home site at UNLV. Maybe it was just a matter of time. "When we learn of copyright infringements, we pursue them," Weiss said.

Despite the lack of case law involving the Internet and copyrights, Gesmer said the OLGA case seems pretty straightforward. "If you post sheet music on the Web, it's clearly copyright infringement," he said.

EMI's threat to UNLV has prompted several OLGA mirror sites at other universities to close down because administrators fear legal action by EMI and other music publishers. A California-based attorney specializing in Internet copyright law said this "chilling effect" probably is what EMI had intended.

"There is a very disturbing trend in the United States for

publishers to 'seize the moment' and ram through their interpretation of copyright laws," said Jonathan Rosenoer, who maintains a Cyberlaw Web site and is writing a book on the Internet and copyright law. "This has been a very strong movement of late."

Rosenoer said publishers with deep pockets "are very much aware that the public knows nothing about copyright laws." This is especially true in regard to the Internet, he said.

The OLGA case appears to be a textbook example of what Rosenoer described. According to Woods, OLGA cannot afford legal representation.

If UNLV and EMI are unable to work out a licensing agreement, he said, the future of the site is in jeopardy. ■

On-line copyright cases are few

While big copyright issues loom in the on-line world, U.S. courts have made rulings in only three such cases:

■ In *Playboy Enterprises, Inc. (PEI) v. Frena* (a subscription computer bulletin board system), a federal court in Florida ruled in 1993 that Frena infringed upon PEI's trademarks when it used "Playboy" and "Playmate" logos in unauthorized transmissions of PEI's photographs.

■ In *Sega Enterprises, Ltd. v. MAPHIA* (also a bulletin board service), a federal court in California in 1994 ruled that MAPHIA solicited pirated copies of Sega video games.

■ In perhaps the most well-known case, *Religious Technologies Center (Church of Scientology) v. Netcom*, a federal court in California ruled four months ago that an Internet access provider may be liable for copyright infringement if it knew (or should have known) that an unauthorized copy of a copyrighted work was being posted through its system and was able to take simple measures to prevent further damage to the copyright owner.

The case is still unresolved, and the court is trying to determine when Netcom knew it was allowing transmission of copyrighted material and what it could have done to stop it.

—Chris Nerney

Xerox PARC takes on replication conundrum

By Barb Cole
Palo Alto, Calif.

The prestigious research organization that pioneered the graphical user interface and Ethernet networking is now taking on the challenge of data replication.

A research project called Bayou under way at Xerox Corp.'s Palo Alto Research Center (PARC) is aimed at making it easier for mobile users to synchronize their personal databases with databases on corporate servers. Replication is a key tool for disconnected users, such as sales representatives, who need to copy local data updates to other databases.

The development is timely, as replication between mobile

databases and corporate servers has become a priority for many software vendors. Oracle plans to include replication in its Personal Oracle Lite portable database, and Sybase, Inc. offers it between its SQL Anywhere mobile database and SQL Server.

Today, most mobile databases employ a limited replication technique that typically requires changes to be copied to one database at a time. The goal of PARC's Bayou project is to provide a more flexible replication scheme that enables the mobile database to synchronize with a number of servers, or even assume the role of primary database.

One challenge with this kind

of replication, dubbed update-anywhere replication by the database companies, is dealing with the conflicts that arise when more than one user tries to update data. Some replication tools get around this by assigning ownership to data and placing a priority on the owner's changes. Other tools simply accept the most recent update. Neither method is bulletproof.

Bayou solves this by embedding logic within applications that detects and resolves conflicts. And access to one server is sufficient for a client to read and write data to multiple servers.

Researchers at PARC have published several papers on their World-Wide Web site describing Bayou, but their plan for Bayou is unclear. "We're not developing products; we're doing research," said Doug Terry, one of the project researchers. "We might license it [to other software companies] since Xerox is not a database company."

The Bayou system was designed to support a variety of collaborative applications, such as shared calendars, mail and bibliographic databases for disconnected workgroups.

But the researchers believe the technology will have broader applications. "This technology is needed through-

out the organization," Terry said.

"[The researchers] recognize that there has to be collision detection and resolution [in replication software]. That's something that the rest of the market hasn't done yet," said Randy Eash, vice president of Consultant International USA Corp., a consultancy in Las Vegas.

Link to Network World Fusion for more info, including:

- Papers by Xerox's PARC on the Bayou system architecture
 - Reports on database replication across WANs
 - A bibliography of resources on mobile database access
- Select News+ then Front Page.

<http://www.nwfusion.com>

Eash, the architect of Computer Associates International, Inc.'s CA-Ingres Replicator and Praxis International, Inc.'s OmniReplicator, said Bayou may "enable the researchers to work out some of the theoretical kinks involved in replication that will benefit other companies."

But Bayou is limited because it requires custom coding within applications. "It's hard enough to get programmers to write SQL, let alone algorithms that are consistent across a replicated

Oracle

Continued from page 1

The next gateways to gain bidirectional replication support are for Software AG's ADABAS and IBM's IMS, two mainframe mainstays. Those gateways are due in June and at the end of the year, respectively.

The company later will ship replication gateways for Sybase's SQL Server, Informix's OnLine and CA-OpenIngres, according to Gary Bloom, vice president of mainframe and integration technology.

Timing, though, is murky. "We don't have a delivery timetable on those yet," Bloom said.

Oracle's mixed replication scheme involves reading the transaction logs of competitors' databases and then replicating those changes to its own database. Today, it is possible to copy transactions from Oracle into non-Oracle databases using the gateways.

This approach, however, is limited — just a one-way link from Oracle to another database. "All the databases let you push data into other people's databases. If you want to go the other way, you have to mix and match a lot of software, and it gets complex and expensive," said Judy Davis, an analyst at Database Associates International, Inc., a research firm in Morgan Hill, Calif.

The strategy could lure customers worried about migration issues. "This could help someone move to Oracle without hav-

ing to reengineer the programs they already have in another database," said Carl Hughes, database administrator at Systems Tax Service, Inc., a payroll tax service bureau in Fountain Valley, Calif.

Doing some catch-up

The gateways will help Oracle catch up to more aggressive competitors, most notably IBM and

REPLICATION ROUNDUP

ORACLE'S REPLICATION EXPANSION PLAN

Database supported	Availability
► IBM DB2/400 and DB2 MVS	April
► IBM IMS	June
► Software AG ADABAS	End of 1996
► Informix OnLine, CA-OpenIngres, Sybase SQL Server	Unannounced

Sybase, analysts said. IBM's Data Propagator-Relational software supports bidirectional replication between DB2 and several databases. And Sybase now offers replication agents for several competitive databases as well as Lotus Development Corp. Notes.

By summer, all Oracle gateway products will support Simple Network Management Protocol, enabling systems administrators to manage gateways the same way they manage the databases.

The company is expected to show a prototype of the SNMP support at a gathering of Oracle gateway users to be held at the end of this month. ■

Novell

Continued from page 6

base, rather than maintaining separate name spaces for Unix and NetWare/IP nets.

NetWare/IP 2.2 also supports the Windows Internet Naming Service (WINS) IP address resolution database in Windows NT Server, allowing NetWare/IP to handle NT Server IP addressing, according to Michael Simpson, product-line manager for NetWare products at Novell.

In previous editions, NetWare/IP could not share IP address information with WINS

or DNS, meaning NetWare/IP servers had to be located on subnets that required separate administration, Simpson said.

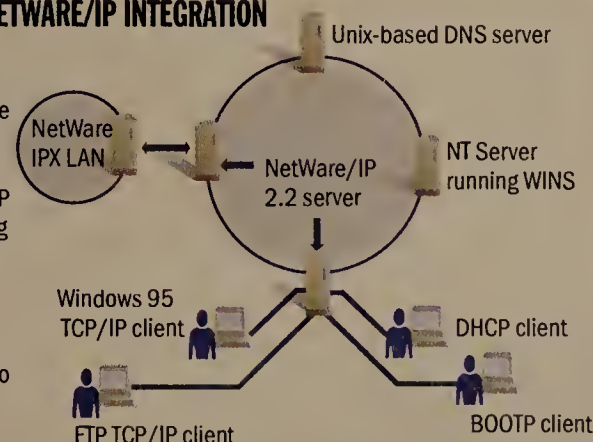
On the client side, NetWare/IP 2.2 supports client TCP/IP stacks from FTP Software, Inc., as well as stacks in Microsoft Corp.'s Windows 95 and NT Workstation operating systems.

NetWare/IP 2.2 is available free at <http://netware.novell.com/smallbiz>, or on Novell's NetWare forum on CompuServe. After April 1, a CD-ROM version will be available for \$49.

©Novell: (800) 395-7135.

NOVELL EASES NETWORK/IP INTEGRATION

NetWare/IP 2.2 enhancements make it easier to plug NetWare servers into standard TCP/IP networks supporting a variety of clients and servers. They also enable NetWare/IP servers to act as gateways to NetWare IPX networks.



GRAPHIC BY D. BARKER

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Gibbs releases his high-tech toy picks of the month

Music, maestro! (Sing to the tune of "These are a few of my favorite things"):

Smooth running networks
And happy end users,
Fixes for "features"
And no nerdy losers,
Stacks of green bank notes
Tied up with string,
These are a few of those digital things.
When the job bites,
When the phone rings,
When I'm feeling whacked,
I simply remember my digital things
And then I don't feel so bad.

Ah, there's nothing like good music (and that's nothing like good music).

There's also nothing like our digital toys. Be they hardware or software, if you have to use a computer and you actually enjoy what you do (this immediately excludes accountants, actuaries and salespeople), then you will have a number of gadgets and apps that you really like.

(As an aside of minimal relevance, I'd like to share with you the definition of an actuary: Someone who comes down from the hills after the battle to kill off the wounded to make them easier to classify. This definition can, of course, be applied to any job function you please. But I digress....)

Among my current favorite toys is a device that you cannot live without if you do presentations. This digital delight is a thing called the Mind Path Remote Control from Mind Path Technologies of Dallas. It's a wireless, teardrop-shaped gadget that you hold in your hand and a little gizmo you plug into a serial port.

On the handheld part, there are five buttons that can be assigned various functions, a two-way rocker that is usually assigned to key sequences to advance a presentation package to the next slide or go in reverse, and a four-way rocker switch that functions as a mouse control.

It will operate over a distance of 40-ish feet and has some great special effects that will even make a presentation on why your project is horribly overdue and over-budget look snazzy at least. Who knows — it might even deflect a little of the heat.

What impresses me is that this device

If you have to use a computer and you actually enjoy what you do, then you will have a number of gadgets and apps that you really like.

does what it is intended to do. This is a huge achievement in a market where hidden product flaws abound. It has gotten so bad that even the discovery of a totally lethal "feature" is of hardly any note whatsoever. Hohum.

My favorite software tools of the month are Vermeer's (now Microsoft's) FrontPage, probably the best World-Wide Web editor I've used so far, and HiJaak Graphics Suite '95 from Quarterdeck, an outstanding image manipulation tool set. I also have to say that I really like

Windows 95. (Does that destroy my street credibility? Did I have any to begin with?)

My favorite big-ticket gadget is what is now called the "Refrigerator" in the Gibbs & Co. corporate offices. (Corporate motto: "Madness takes its toll. Please have exact change.") This is a rack system on wheels from J&L Chatcom of Chatsworth, Calif., which contains three separate computers, each with 100-MHz 486 DX4s, supported by dual power supplies and three fans — this thing is built to last!

I could actually have five processors, which could be field-upgraded to Pentium Pros in a matter of seconds. This is a cool system, as it takes up a lot less real estate than having three separate machines, and is more reliable.

Those are my toypicks of the month. What are yours? If we get enough responses, I'll do something dynamic like write about 'em and put them on a Web page.

Let Gibbs know what your favorite toys are at mjgibbs@gibbs.com or call (800) 622-1108, Ext. 504.



Mark Gibbs

Competition? Internet phones make telcos call for FCC help

My wife was intently clipping oval shapes from a stack of photographs; our albums were strewn about the floor. "Maggie, what are you doing?" I cried. "Don't worry, I'm just cutting out the face of your last wife," she said. "I didn't think you'd mind."

Divorce is like that. People marry because there is love and hope in the future of their relationship. Then a few problems perk up and before you know it, someone wants to bolt.

The "marriage" of the Telecommunications Act of 1996, which supposedly united various industries to compete for the public good, may become a record short union.

Last week, America's Carriers Telecommunication Association (ACTA) petitioned the Federal Communications Commission to stop vendors from selling products that allow voice calls over the Internet.

ACTA also wants the FCC to define what sorts of communications are permissible over the Internet. Heavy call.

The "marriage" of the Telecommunications Act of 1996 may become a record short union.

Until now, I have perceived Internet phone service as a quaint but inconvenient scheme to save a few bucks on international calls. Consider the facts:

■ Internet phones are a hassle to use. Both parties must be logged on to the Internet at the same time; otherwise, they must coordinate in advance.

■ Service is usually half-duplex, which means just one person can speak at a time. Users have to pronounce complete thoughts and wait, instead of spurring half-sentences and grunts as normal humans do.

■ Users must also have powerful multimedia computing gear merely to achieve questionable service quality.

Seems innocuous, even nerdy. Yet ACTA's petition cites "unfair competition" and claims that this unregulated bypass of "traditional means by which long-distance services are sold" might

create "serious economic hardship on all existing participants in the long-distance marketplace and the public."

Whew! ACTA wants the FCC to ready those scissors.

ACTA, incidentally, is an 11-year-old, 130-member trade association whose typical member grosses less than \$50 million a year in revenue. Executive Director Jennifer Durst-Jarrell would not reveal member names.

She did say that members are mainly long-distance companies ("not AT&T," she said when queried about the Big Three), but also include local and alternative access service providers, two regional Bells, three "major" cable companies and three venture capital firms.

Bad guys named by ACTA include VocalTec, Inc., Internet Telephone Co., Third Planet Publishing, Inc. and Quarterdeck Corp.

ACTA argued that these companies are telecommunications providers and should be regulated by the FCC.

The petition omitted many other firms that make Internet phone software. A couple of free products available over the Web include Speak Freely by Autodesk founder John Walker (www.fourmilab.ch) and CU-SeeMe from Cornell University (cu-seeme.cornell.edu).

Specious logic

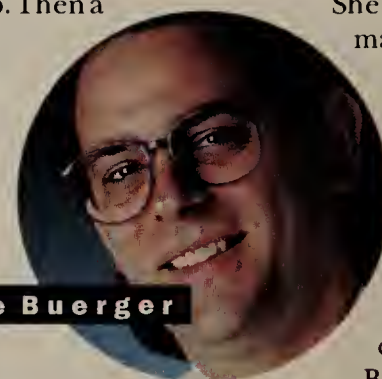
On the one hand, I understand ACTA members' concern. For years, they have battled huge, long-distance carriers for a piece of long-haul action. Now they must also fight the Baby Bells — and these pip-squeak makers of Internet phone software. Life is unfair.

ACTA's members are also mad. They entered this game thinking long-distance service would be sold as it always has. Now they have to switch plans and deal with — ugh — upstart competitors!

Telephone service providers of all sizes should check their premises. Competition means "may the best idea win," not "give us a boost with regulation." When will they ever learn?

"All done with that wife," said Maggie as she swept the oval faces into a trash can. "Now, Dave, where did you put those pictures of your first wife?"

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.



Dave Buerger

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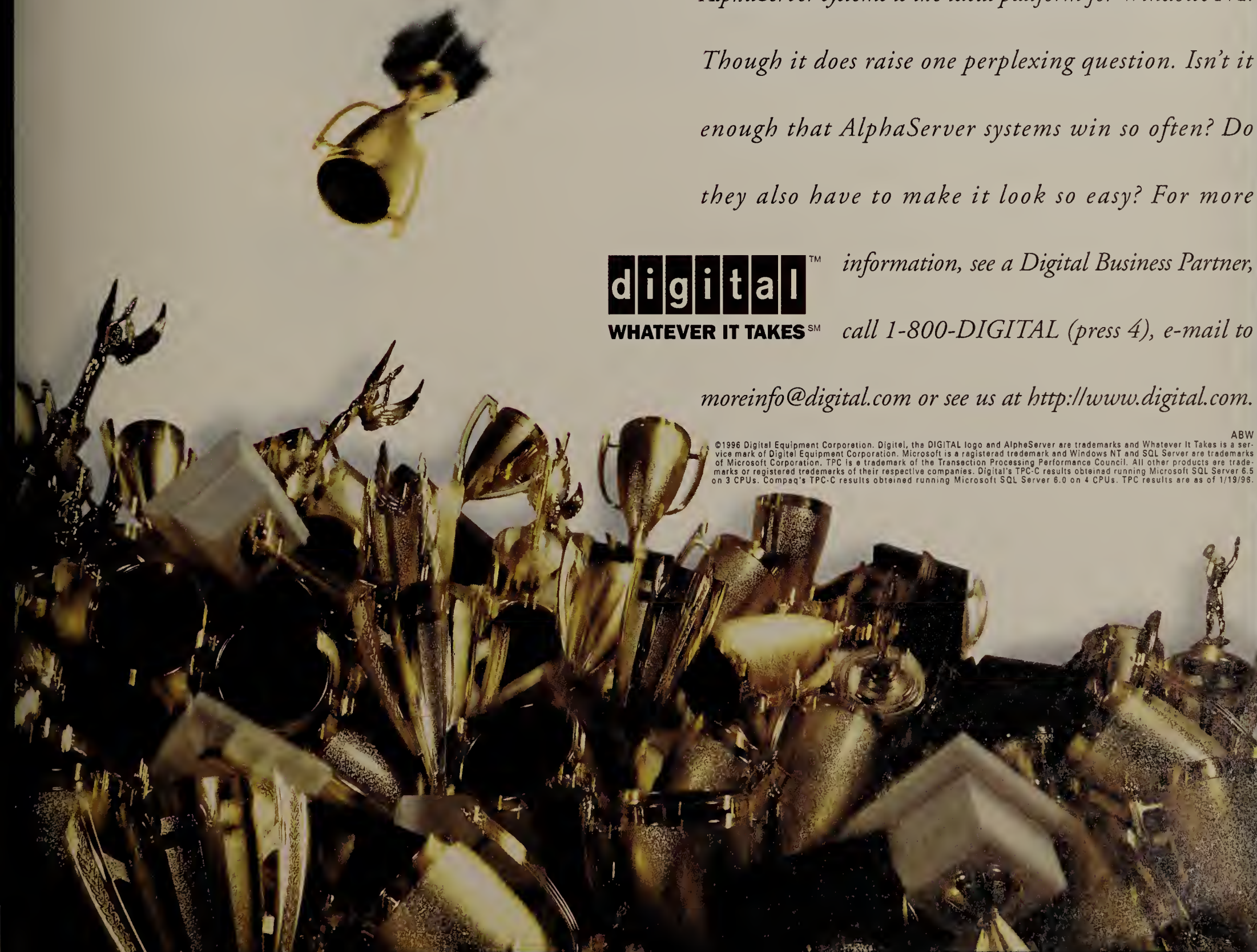
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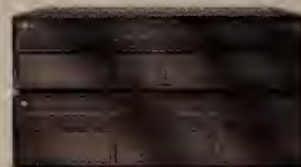
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